



## **Emulex Driver for Linux Download Manual**

### **Version 7.1**

### **Table of Contents**

[Supported Features](#)

[New Features in this Release](#)

[Prerequisites](#)

[Compatibility](#)

[Things to Know Before You Download](#)

[Known Issues](#)

## Supported Features

- Supports 256 LUNs (0-255)
- Supports dynamically adding LUNs and targets
- Simplified driver installation
- Topology support: FC-AL, point-to-point, fabric with auto-topology negotiation
- Support for 1 and 2 Gb with auto rate negotiation
- Protocols: SCSI-FCP, FCP-2 (FC-Tape profile, including use of ADISC instead of PLOGI), FC initiator mode
- Persistent bindings by WWNN, WWPN or D\_ID (different methods can be set on an adapter port basis)
- Support for up to thirty-two HBA ports
- Monitoring, parameter configuration and binding settings using Emulex's HBAnyware<sup>TM</sup> Java-based graphical user interface utility
- Parameter configuration using Emulex's lputil<sup>TM</sup> command-line interface utility
- Support for Common HBA API

## New Features in this Release

Linux version 7.1:

- Supports 256 LUNs (0-255).
- Supports dynamically adding LUNs and targets.
- Makes driver installation easier.

## Driver Information

### Prerequisites

#### For the Application Helper Module:

The Emulex 7.1 driver is included in the Red Hat Enterprise Linux 3 Update 4 distribution. If you are using the Red Hat Enterprise Linux 3 Update 4 distribution, you only need to install the Application Helper Module. The Application Helper Module enables you to use Emulex applications to manage and configure the driver. The Application Helper Module supports the following architectures:

- Red Hat Enterprise Linux 3 Update 4 (Intel x86, Intel Itanium2, Intel and AMD x86\_64 architectures)

#### For the Emulex Open Source Driver Kit for Linux:

The lpfc driver kit includes the lpfc driver and the Application Helper Module. The lpfc driver kit supports the following architectures:

- SUSE Linux Enterprise Server 8 Service Pack 3 (Intel x86, Intel Itanium2, Intel and AMD x86\_64 architectures)
- Red Hat Enterprise Linux 2.1 Updates 5 and 6 (Intel x86 and Intel Itanium2 architectures)
- Red Hat Enterprise Linux 3 Updates 2, 3 and 4 (Intel x86, Intel Itanium2, Intel and AMD x86\_64 architectures)

### Compatibility

- LP10000ExDC and LP1050Ex (minimum firmware version 1.90a4)
- LP10000DC and LP10000 (minimum firmware version 1.90a4)
- LP1050DC and LP1050 (minimum firmware version 1.90a4)
- LP9802DC (minimum firmware version 1.90a4)
- LP9802 (minimum firmware version 1.90a4)
- LP982 (minimum firmware version 1.90a4)

- LP9402DC, LP9002DC, LP9002L and LP9000 (minimum firmware version 3.90a7)
- LP952L (minimum firmware version 3.92a2)
- LP8000 and LP8000DC

#### Determining Your Dragonfly Chip Version (Required for LP8000 and LP8000DC Only)

- If your HBA has a Dragonfly chip version 2.00 or greater, use firmware version 3.90a7.
- If your HBA has a Dragonfly chip below version 2.00, use firmware version 3.30a7.

## Things to Know Before You Download

- Select a device driver download if you are updating an existing driver on your hard drive, or you want to install the driver on your hard drive.

## Known Issues

- **FCP – Discovering Disk Drives.** To list all the SCSI devices discovered at boot time, enter this command:

```
cat /proc/scsi/scsi
```

- Although the driver recognizes disk drives at boot time, you may not be able to use those drives until special file entries are created for them. By default, Linux provides special fields for up to 16 SCSI devices. With the Emulex driver, targets 1 through 255 are supported, with up to 128 LUNs per target. To create additional special files, use the 'MAKEDEV' command in the /dev directory.

**Note** All SCSI device files are created if you are using SuSE SLES 8.

- If you are using a device driver download, you must first have a SCSI or IDE boot/root device in order to create a Fibre Channel (lpfc) boot device.

# Verify the Dragonfly Chip Version

## Introduction

There are five methods for determining the Dragonfly chip version:

- Looking at the Host Bus Adapter
- Using the Remote Management Utility (HBAnyware)
- Using the SCSIport Miniport driver utility (lputilnt or lputil64)
- Using the UNIX-based utility (lputil)
- Using the DOS utility (lp6dutil)



## Looking at the Host Bus Adapter

The Dragonfly version number can be found on the top of the large chip, usually after the term "DRAGONFLY" or "DFLY".



## Use HBAnyware

The Details tab in HBAnyware contains detailed attributes associated with the selected HBA.

To view the detailed attributes, do the following:

1. Start HBAnyware:

To start HBAnyware for Linux or Solaris:

1. su to root.
2. Run the script:

```
/usr/sbin/hbanyware/hbanyware
```

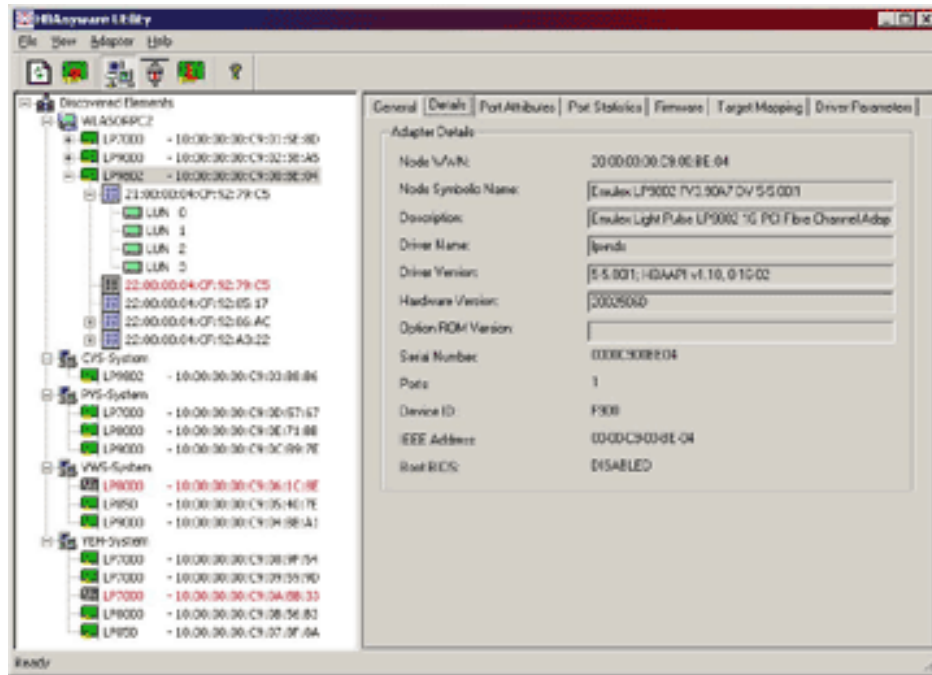
To start the HBAnyware Security Configurator for Linux or Solaris:

1. su to root.
2. Run the script:

```
/usr/sbin/hbanyware/ssc
```

To start HBAnyware for Windows:

- Click the Start button, click Programs and choose HBAnyware.
2. If desired, sort the discovered HBAs.
3. Click an HBA in the discovery tree. The General tab is displayed.
4. Click the Details tab.



##### 5. Locate the Hardware Version field.

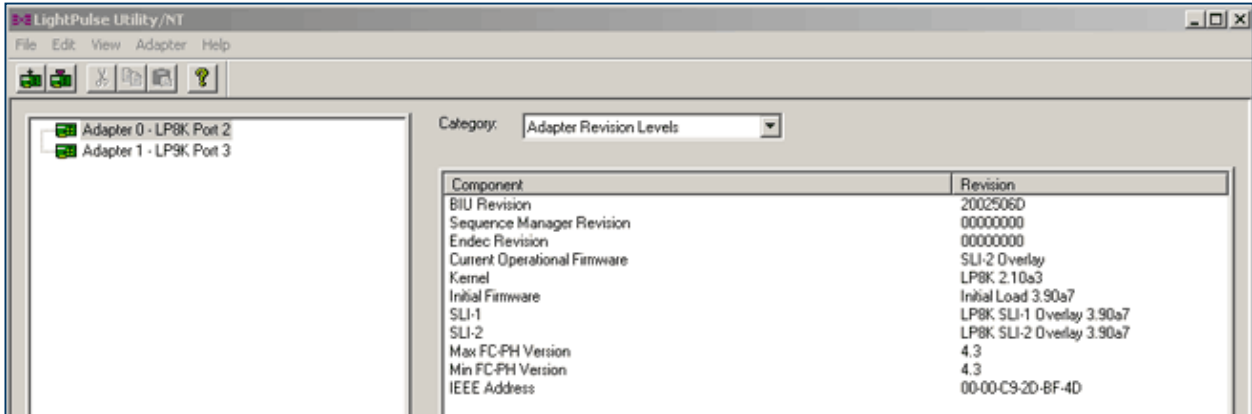
- LP8000 v1 shows a chipset revision that contains 210 near the end of the HBA's hex number (Dragonfly revision number)
- LP8000 v2 shows a chipset revision that contains 250 near the end of the HBA's hex number.

lputilnt and lputil64 are executable files. Run the file from your local hard drive.

1. Start the utility in one of two ways:

- Click Start, Programs and lputilnt (or lputil64).
- Browse to the lputilnt.exe or lputil64.exe file and run this command.

The main window is displayed:



2. Locate the BIU Revision field.

- LP8000 v1 shows a chipset revision that contains 210 near the end of the HBA's hex number (Dragonfly revision number)
- LP8000 v2 shows a chipset revision that contains 250 near the end of the HBA's hex number.

## Use lputil

1. Enter the appropriate command to start the lputil utility:

```
For AIX enter:    /usr/lpp/diagnostics/lputil
For HP-UX enter: /opt/lpfc/bin/lputil
For Linux enter:  /usr/sbin/lpfc/lputil
For Solaris PCI bus enter: /usr/sbin/lpfc/lputil
```

The main menu is displayed.

```
LightPulse Common Utility version 1.1 (3/17/99)
Copyright (c) 1999, Emulex Network Systems, Inc.

Emulex Fibre Channel Host Adapters Detected: 1
Host Adapter 0 is an LP7K (Ready Mode)

MAIN MENU

1. List Adapters
2. Adapter Information
3. Firmware Maintenance
4. Reset Adapter

0. Exit

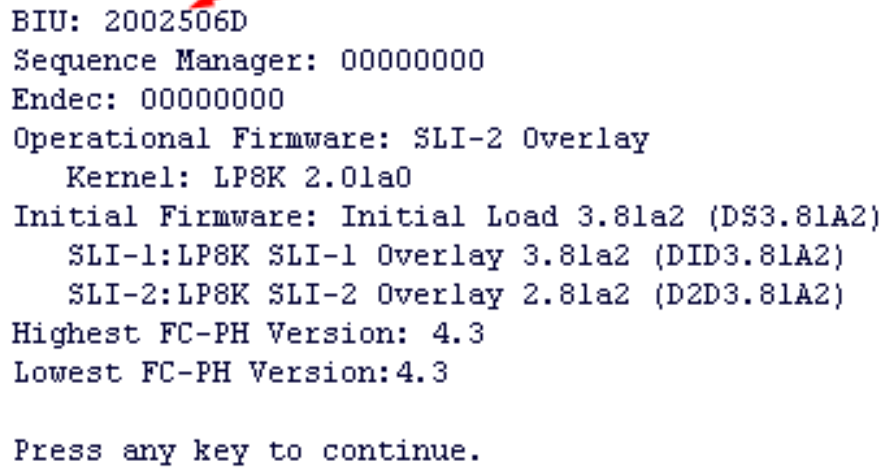
Enter Choice =>
```

2. Select 2, Adapter Information. The Adapter Information Menu is displayed.

```
1. BIU PCI Configuration Parameters
2. Adapter Revision Levels
3. Wakeup Parameters
4. IEEE Address
5. Loop Map
6. Status & Counters
7. Link Status
8. Configuration Parameters

0. Return to Main Menu.
```

3. Select 2, Adapter Revision Levels. If there are multiple host adapters, a list displays and you need to select an adapter. The following type of information displays for the host bus adapter (this is an example only).



```
BIU: 2002506D
Sequence Manager: 00000000
Endec: 00000000
Operational Firmware: SLI-2 Overlay
Kernel: LP8K 2.01a0
Initial Firmware: Initial Load 3.81a2 (DS3.81A2)
SLI-1:LP8K SLI-1 Overlay 3.81a2 (DID3.81A2)
SLI-2:LP8K SLI-2 Overlay 2.81a2 (D2D3.81A2)
Highest FC-PH Version: 4.3
Lowest FC-PH Version:4.3

Press any key to continue.
```

LP8000 v1 shows a chipset revision that contains 210 near the end of the BIU number.

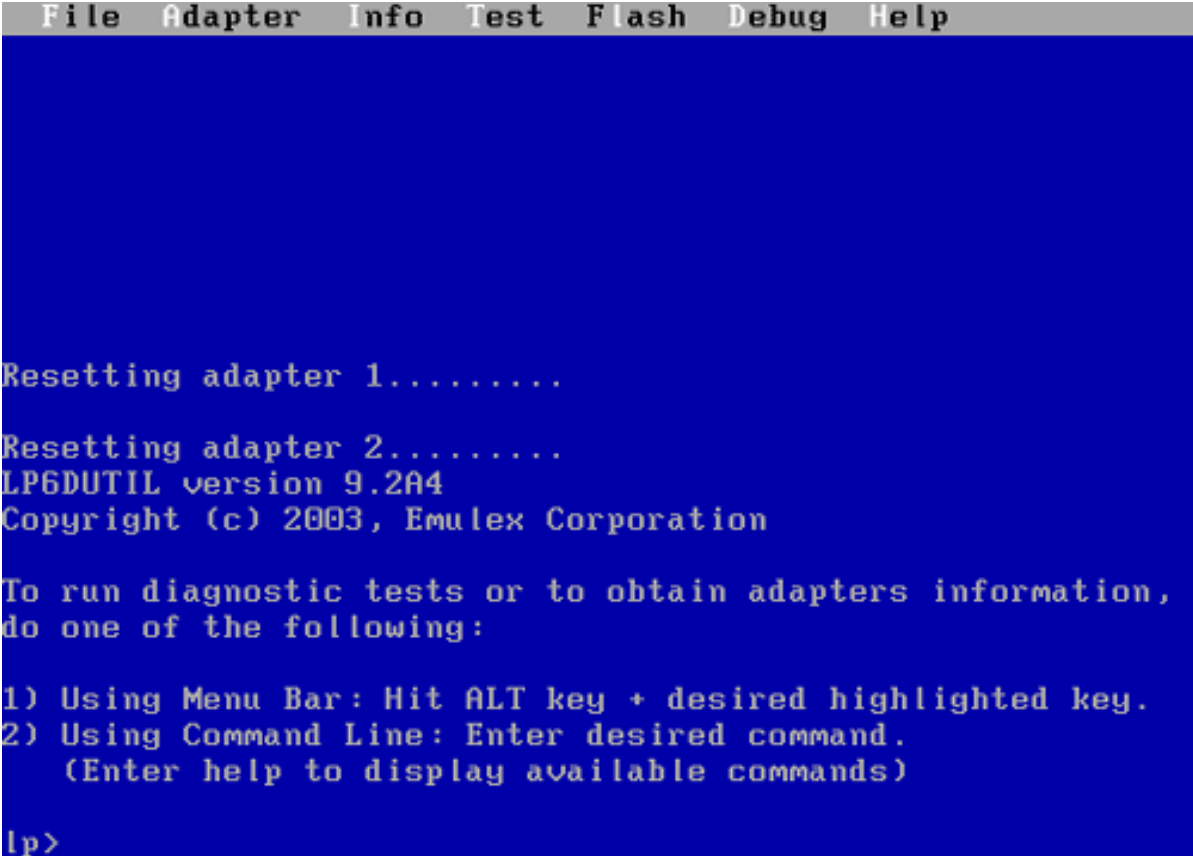
LP8000 v2 shows a chipset revision that contains 250 near the end of the BIU number.

## Use Ip6dutil

1. Boot up the computer in DOS.
2. From the directory where the lp6dutil.exe file resides, enter the following command:

**lp6dutil**

A window displays with the menu bar near the top and the lp> prompt near the bottom of the window.



```

File  Adapter  Info  Test  Flash  Debug  Help

Resetting adapter 1.....

Resetting adapter 2.....
LP6DUTIL version 9.2A4
Copyright (c) 2003, Emulex Corporation

To run diagnostic tests or to obtain adapters information,
do one of the following:

1) Using Menu Bar: Hit ALT key + desired highlighted key.
2) Using Command Line: Enter desired command.
   (Enter help to display available commands)

lp>

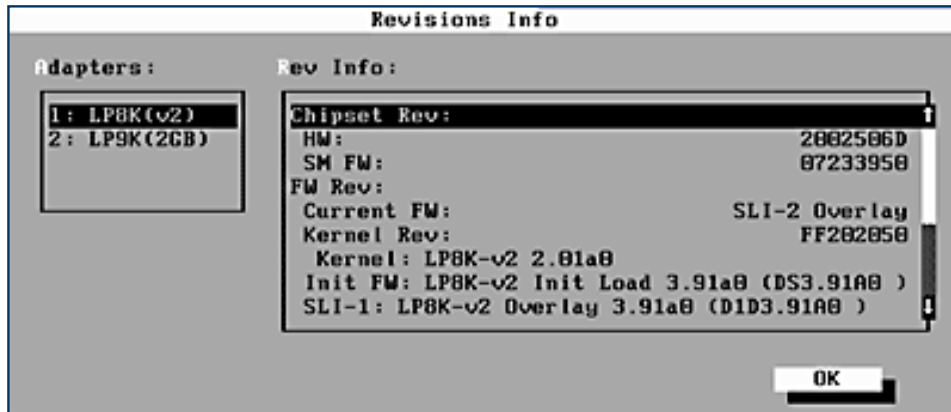
```

The lp6dutil program runs preliminary tests on all host adapters.

3. Select the Info Menu:



4. Press R. The Revisions Info window is displayed.



5. Select an adapter.

- LP8000 v1 shows a chipset revision that contains 210 near the end of the HW information (DragonFly Revision number).
- LP8000 v2 shows a chipset revision that contains 250 near the end of the HW information.





## **Emulex Driver for Linux Installation Manual**

### **Version 7.1**

### **Table of Contents**

- [Prerequisites](#)
- [Compatibility](#)
- [Application Helper Module Installation for RHEL 3 Update 4](#)
  - [Installing the Application Helper Module](#)
  - [Application Helper Module Install Script Options](#)
  - [Directory Structure](#)
  - [Removing a Previous Application Helper Module](#)
- [Driver Kit Installation for Other Distributions](#)
  - [Installing the Driver Kit](#)
  - [Driver Kit Install Script Options](#)
  - [Directory Structure](#)
  - [Upgrading the Kernel](#)
  - [Removing a Previous 7.x Driver](#)
  - [Removing a 4.x or 1.x Driver](#)
  - [Removing a 2.x Driver](#)
- [Installing the Utilities](#)
- [Installing the HBAnyware Security Configurator](#)

## Driver Information

### Prerequisites

#### For the Application Helper Module:

The Emulex 7.1 driver is included in the Red Hat Enterprise Linux 3 Update 4 distribution. If you are using the Red Hat Enterprise Linux 3 Update 4 distribution, you only need to install the Application Helper Module. The Application Helper Module enables you to use Emulex applications to manage and configure the driver. The Application Helper Module supports the following architectures:

- Red Hat Enterprise Linux 3 Update 4 (Intel x86, Intel Itanium2, Intel and AMD x86\_64 architectures)

#### For the Emulex Open Source Driver Kit for Linux:

The lpfc driver kit includes the lpfc driver and the Application Helper Module. The lpfc driver kit supports the following architectures:

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- LP9802 (minimum firmware version 1.90a4)
- LP982 (minimum firmware version 1.90a4)

- LP9402DC, LP9002DC, LP9002L and LP9000 (minimum firmware version 3.90a7)
- LP952L (minimum firmware version 3.92a2)
- LP8000 and LP8000DC

#### Determining Your Dragonfly Chip Version (Required for LP8000 and LP8000DC Only)

- If your HBA has a Dragonfly chip version 2.00 or greater, use firmware version 3.90a7.
- If your HBA has a Dragonfly chip below version 2.00, use firmware version 3.30a7.

## Installing the Application Helper Module

The `ioctl-install` script installs the `lpfcdfc` driver RPM. This RPM installs the driver sources to the `/usr/src/lpfcdfc` directory, builds a driver for the currently running kernel, and then installs the driver to the proper directory for the currently running kernel.

The `'elxlpfc'` init script is also installed and configured to start and stop the `'lpfcdfc'` driver during system startup and shutdown.

**Note** The HBAware™ and LightPulse™ (lputil) utilities are bundled together and must be installed separately from the driver. Refer to the "Installing the Utilities" section of this manual for more information.

To install the Emulex driver for Linux:

1. Install a supported Emulex host bus adapter in the system. Refer to the adapter's Installation manual for specific hardware installation instructions.
2. Download the driver from the Emulex web site or copy it to the system from the installation CD.
3. Log on as 'root' to a terminal, and unpack the tarball with the following command:

```
tar xzf lpfc_2.4_ioctl_module_kit-<module version>.tar.gz
```

4. Change the directory to the directory that is extracted:

```
cd lpfc_2.4_ioctl_module_kit-<module version>/
```

5. Execute the `ioctl-install` script with no options to install the new driver kit. Type:

```
./ioctl-install
```

Once the `ioctl-install` script has completed successfully, the Emulex `lpfcdfc` driver is loaded, and Fibre Channel disks that are properly connected to the system are accessible.

## Application Helper Module Install Script Options

The following options are available for use with the Emulex Helper Module install script for Linux:

- -h,--help - Prints a help message describing command line parameters.
- -u,--uninstall - Uninstall previously installed driver kit.

## Directory Structure

After installation, the following directories are created on the system.

Directory	Description
<b>/usr/sbin/lpfc</b>	driver utilities (This directory is created after the utilities are installed.)
<b>/usr/src/lpfcdfc</b>	driver source files
<b>/usr/sbin/hbanyware</b>	HBAnyware files (This directory is created after the utilities are installed.)

## Removing a Previous Application Helper Module

To completely remove a previous Emulex Helper Module:

1. Log on as 'root'.
2. If possible, exit all applications that use Fibre Channel-attached drives, then unmount the drives. If you cannot exit all applications that use Fibre Channel-attached drives, the uninstall will work properly, but you must reboot after the uninstallation is complete.

3. Stop HBAnyware. Type:

```
cd <path>./  
stop_hbanyware
```

The script is located in the /usr/sbin/hbanyware directory.

4. Remove previous installations of HBAnyware. Type:

```
rpm -e  
HBAnyware
```

5. Stop AutoPilot. Type:

```
cd <path>./  
stop_autopilot
```

The script is located in the /usr/sbin/hbanyware directory.

6. Remove previous installations of AutoPilot. Type:

```
rpm -e  
AutoPilot
```

7. Change to the directory that was extracted from the tarball during installation.

8. Execute the ioctl-install script with the '--uninstall' option. Type:

```
./ioctl-install --uninstall
```

9. If prompted, reboot the system.



## Installing the Driver Kit

The `lpfc-install` script installs both the `lpfc` driver and the `lpfcdfc` driver RPMs. These RPMs install their driver sources to the `/usr/src/lpfc` directory, build their drivers for the currently running kernel, and then install the drivers to the proper directory for the currently running kernel.

Once the RPMs are installed, the `lpfc-install` script creates a new ramdisk for the currently running kernel so that the '`lpfc`' driver is loaded when the kernel is initialized during system startup. The '`elxlpfc`' init script is also installed and configured to start and stop the '`lpfcdfc`' driver during system startup and shutdown.

**Note** Emulex strongly recommends uninstalling any previous driver kits before installing this driver kit. The '`lpfc-install`' script for version 7.1 uninstalls previous 7.x driver kits and installs the current driver kit.

If you have a previous version of the 7.x driver installed, removal instructions are contained in this installation procedure, or you may refer to the "Removing a Previous 7.x Driver" section in this manual before attempting to install version 7.1.

If you have a version of the 2.x or 1.x driver installed, refer to the "Removing a 2.x or 1.x Driver" section in this manual before attempting to install version 7.1.

**Note** The HBAAnyware™ and LightPulse™ (`lputil`) utilities are bundled together and must be installed separately from the driver. Refer to the "Installing the Utilities" section of this manual for more information.

To install the Emulex driver kit for Linux:

1. Install a supported Emulex host bus adapter in the system. Refer to the adapter's Installation manual for specific hardware installation instructions.
2. Download the driver from the Emulex web site or copy it to the system from the installation CD.
3. Log on as '`root`' to a terminal, and unpack the tarball with the following command:

```
tar xzf lpfc-<driver version>.tar.gz
```

4. Change to the directory that is extracted:

```
cd lpfc-<driver version>/
```

**Note** Emulex strongly recommends uninstalling any previous driver kits before installing this driver kit. The 'lpfc-install' script uninstalls previous 7.x driver kits and installs the current driver kit. To uninstall any previous driver kits, execute the 'lpfc-install' script with the '--uninstall' option. Type:

```
./lpfc-install --uninstall
```

5. Execute the 'lpfc-install' script with no options to install the new driver kit. Type:

```
./lpfc-install
```

**Note** You can also use an alternate 7.x version lpfc.conf configuration file if you wish. For example, you may want to use a version 7.x lpfc.conf file that you customized.

To use an alternate lpfc.conf type:

```
./lpfc-install -c <configuration file name>
```

Once the 'lpfc-install' script has completed successfully, the Emulex lpfc and lpfcdfc drivers are loaded, and Fibre Channel disks that are properly connected to the system are accessible. Reboot the system now to enable the newly added driver options in the ramdisk. You can also reboot the system later if you wish.

## Driver Kit Install Script Options

The following options are available for use with the Emulex install script for Linux:

- `-c,--configfile` - Specify `lpfc.conf` file to use during installation.
- `--configramdisk` - Configure and build a ramdisk image that loads the Emulex driver when the system is booted with the current kernel.
- `--createramdisk` - Create a new ramdisk image. Use this option after you have modified driver parameters in the `lpfc.conf` file and rebuilt the driver.
- `-h,--help` - Prints a help message describing command line parameters.
- `-u,--uninstall` - Uninstall previously installed driver kit.
- `--unconfigramdisk` - Configure and build a ramdisk image that does not load the Emulex driver when the system is booted with the current kernel.

## Directory Structure

After installation, the following directories are created on the system.

Directory	Description
<b>/usr/sbin/lpfc</b>	driver utilities (This directory is created after the utilities are installed.)
<b>/usr/src/lpfc</b>	driver source files
<b>/usr/sbin/hbanyware</b>	HBAnyware files (This directory is created after the utilities are installed.)

## Upgrading the Kernel

There are two ways to install the driver into an upgraded kernel. The method you use depends on whether or not you are upgrading the driver.

- You can upgrade the kernel using the same version of the driver.
- You can upgrade the kernel using a new version of the driver.

### To upgrade the kernel with the same version of the lpfc driver kit installed:

1. Copy the /etc/lpfc.conf file to a safe location; for example, to /etc/lpfc.conf.backup. Type:

```
cp /etc/lpfc.conf /etc/lpfc.conf.backup
```

2. Uninstall the Emulex driver. Type:

```
lpfc-install --uninstall
```

3. Upgrade the kernel and/or distribution.
4. Reboot the system with the new kernel.
5. Re-install the Emulex driver with the lpfc.conf file; to use the previous example, /etc/lpfc.conf.backup. Type:

```
lpfc-install -c /etc/lpfc.conf.backup
```

6. Reboot the system to complete re-installation of the Emulex drivers.

## To upgrade the kernel with a new version of the lpfc driver kit installed:

1. Copy the /etc/lpfc.conf file to a safe location; for example, /etc/lpfc.conf.backup. Type:

```
cp /etc/lpfc.conf /etc/lpfc.conf.backup
```

2. Uninstall the Emulex driver. Type:

```
lpfc-install --uninstall
```

3. Upgrade the kernel and/or distribution.
4. Reboot the system with the new kernel.
5. Install the new Emulex driver. Do NOT use the backup lpfc.conf file. Type:

```
lpfc-install
```

6. Add custom configuration lines to the new /etc/lpfc.conf, using the backup lpfc.conf file as a reference.
7. Rebuild the driver with the new /etc/lpfc.conf changes.

```
cd /usr/src/lpfc  
make  
make install
```

8. Rebuild the ramdisk image with the new lpfc driver. Type:

```
lpfc-install --createramdisk
```

9. Reboot the system to complete the re-installation of the Emulex drivers.

## Removing a Previous 7.x Version of the Driver

**Note** This section describes how to remove a previous installation of an earlier driver. The Emulex 7.1 lpfc.conf file removes several configuration parameters from previous versions. Do NOT replace the current lpfc.conf with lpfc.conf.c or lpfc.conf.defs or lpfc.conf from a previous non 7.x series release. With the 7.1 driver, all configuration parameters are set in the /etc/lpfc.conf file. There is no lpfc.conf.c or lpfc.conf.defs file present in the 7.1 release. To reuse an old configuration, you must backup the previous lpfc.conf.defs, lpfc.conf and lpfc.conf.c file and merge configuration in these files to /etc/lpfc.conf file after installing the new driver and before building the new driver.

**Note** Driver installation or removal does not save the configuration files (i.e. lpfc.conf, lpfc.conf.c or lpfc.conf.defs) from previous installations. If you customized any of these files, we recommend that you copy them to another location so that you have a record of the changes.

To completely remove a previous 7.x version of the driver:

1. Log on as 'root'.
2. If possible, exit all applications that use Fibre Channel-attached drives, then unmount the drives. If you cannot exit all applications that use Fibre Channel-attached drives, the uninstall will work properly, but you must reboot after the uninstallation is complete.
3. Stop HBAnyware. Type:

```
cd <path>./  
stop_hbanyware
```

The script is located in the /usr/sbin/hbanyware directory.

4. Remove previous installations of HBAnyware. Type:

```
rpm -e  
HBAnyware
```

5. Stop AutoPilot. Type:

```
cd <path>./  
stop_autopilot
```

The script is located in the /usr/sbin/hbanyware directory.

6. Remove previous installations of AutoPilot. Type:

```
rpm -e  
AutoPilot
```

7. Change to the directory that was extracted from the tarball during installation
8. Execute the lpfc-install script with the '--uninstall' option. Type:

```
./lpfc-install --uninstall
```

9. If prompted, reboot the system.



## Removing a 4.x or 1.x Version of the Driver

**Note** This section describes how to remove a 4.x or 1.x version driver. The Emulex 7.1 driver adds several new configuration parameters and renames a couple of previous parameters. Do NOT replace the current lpfc.conf with lpfc.conf.c or lpfc.conf.defs or lpfc.conf from a previous release. With the 7.1 driver, all configuration parameters are set in the /etc/lpfc.conf file. There is no lpfc.conf.c or lpfc.conf.defs file present in the 7.1 release. To reuse the old configuration, you must backup the previous lpfc.conf, lpfc.conf.c and lpfc.conf.defs file and merge configuration in these files to /etc/lpfc.conf file after installing the new driver and before building the new driver.

**Note** Driver installation or removal does not save the configuration files (i.e. lpfc.conf, lpfc.conf.c or lpfc.conf.defs) from previous installations. If you customized any of these files, we recommend that you copy them to another location so that you have a record of the changes.

If the driver is installed as a module, do the following to remove the existing driver:

1. Shutdown all applications using storage connected through the lpfcdd driver.
2. Unmount all the file systems mounted through lpfcdd.
  - o If the IP interface of the lpfndd driver is used, shutdown all the lpfndd IP interfaces using following command:

```
ifconfig lpfn<n> down
```

- o Remove the lines in /etc/modules.conf file containing lpfcdd or lpfndd.
- o Remove the lpfndd and lpfcdd modules by executing:

```
rmmod lpfndd
rmmod lpfcdd
rm /lib/modules/<kernel-version>/kernel/drivers/scsi/lpfcdd.o
rm /lib/modules/<kernel-version>/kernel/drivers/scsi/lpfndd.o
```

- o If the IP interface is used, remove the IP interface configuration files by executing the following command:

```
rm /etc/sysconfig/network-scripts/ifcfg-lpfn*
```

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- ```
subdir-$(CONFIG_SCSI_LPFC) += scsi/lpfc
```

- ```
dep_tristate 'Emulex LightPulse Fibre Channel support' CONFIG_SCSI_LPFC $CONFIG_SCSI
```

- ```
obj-$(CONFIG_SCSI_LPFC) += lpfcdd.0
```

- ```
dep_tristate 'Emulex LightPulse Fibre Channel support' CONFIG_NET_LPFC $CONFIG_SCSI
```

- ```
extern int lpfn_probe(void);
static int lpfnif_probe(struct net_device *dev)
{
#ifdef CONFIG_NET_LPFC
lpfn_probe();
#endif
return 0;
}
```

- ```
static struct net_device lpfm_dev = {  
    "lpfn", 0, 0, 0, 0, 0, 0, 0, 0, 0, NEXT_DEV, lpfnif_probe};  
# undef NEXT_DEV  
# define NEXT_DEV (&lpfm_dev)
```

- 34

Remove the old driver installation files as follows:

1. If the driver is installed from a tar file, execute Remove.sh in the old installation directory to remove all of the installed files.
2. If the driver is installed from an rpm, execute the following commands to remove files installed by the rpm install.

```
rpm -e <rpm-name>
```

3. If the driver was installed in the kernel source tree, execute the following command to remove the lpfcdd driver files from the kernel source tree.

```
rm -rf /usr/src/linux/drivers/scsi/lpfc/*
```

## Removing a 2.x Version of the Driver

**Note** This section describes how to remove a 2.x version driver. The Emulex 7.1 driver adds several new configuration parameters and renames a couple of previous parameters. Do NOT replace the current lpfc.conf with lpfc.conf.c or lpfc.conf.defs or lpfc.conf from a previous release. With the 7.1 driver, all configuration parameters are set in the /etc/lpfc.conf file. There is no lpfc.conf.c or lpfc.conf.defs file present in the 7.1 release. To reuse the old configuration, you must backup the previous lpfc.conf.defs, lpfc.conf and lpfc.conf.c file and merge configuration in these files to /etc/lpfc.conf file after installing the new driver and before building the new driver.

**Note** Driver installation or removal does not save the configuration files (i.e. lpfc.conf, lpfc.conf.c or lpfc.conf.defs) from previous installations. If you customized any of these files, we recommend that you copy them to another location so that you have a record of the changes.

If the driver is installed as a module, do the following to remove the existing driver:

1. Shutdown all applications using storage connected through the lpfcdd driver.
2. Unmount all the file systems mounted through lpfcdd.
  - o If the IP interface of the lpfndd driver is used, shutdown all the lpfndd IP interfaces using following command:

```
ifconfig lpfn<n> down
```

- o Remove the lines in /etc/modules.conf file containing lpfcdd or lpfndd.
- o Remove the lpfndd and lpfcdd modules by executing:

```
rmmod lpfndd
rmmod lpfcdd
rm /lib/modules/<kernel-version>/kernel/drivers/scsi/lpfcdd.o
rm /lib/modules/<kernel-version>/kernel/drivers/scsi/lpfndd.o
```

- o If the IP interface is used, remove the IP interface configuration files by executing the following command:

```
rm /etc/sysconfig/network-scripts/ifcfg-lpfn*
```

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- ```
subdir-$(CONFIG_SCSI_LPFC) += scsi/lpfc
```

- ```
dep_tristate 'Emulex LightPulse Fibre Channel support' CONFIG_SCSI_LPFC $CONFIG_SCSI
```

- ```
obj-$(CONFIG_SCSI_LPFC) += lpfcdd.0
```

- ```
dep_tristate 'Emulex LightPulse Fibre Channel support' CONFIG_NET_LPFC $CONFIG_SCSI
```

- ```
#ifdef CONFIG_NET_LPF
extern int lpf_probe(void);
static int lpfif_probe(struct net_device *dev)
{
    lpf_probe();
    return 1;
}
#endif
```

- ```
#ifndef CONFIG_NET_LPFC
static struct net_device lpfm_dev = {
    "lpfn", 0, 0, 0, 0, 0, 0, 0, 0, 0, NEXT_DEV, lpfnif_probe};
# undef NEXT_DEV
# define NEXT_DEV (&lpfm_dev)
#endif
```

- 37

Remove the old driver installation files as follows:

1. If the driver is installed from a tar file, execute Remove.sh in the old installation directory to remove all of the installed files.
2. If the driver is installed from an rpm, execute the following commands to remove files installed by the rpm install.

```
rpm -e <rpm-name>
```

3. If the driver was installed in the kernel source tree, execute the following command to remove the lpfcdd driver files from the kernel source tree.

```
rm -rf /usr/src/linux/drivers/scsi/lpfc/*
```

## Installing the Utilities

Follow these instructions to install HBAnyware and lputil on your system. For ease of installation, HBAnyware and lputil are bundled together.

### Prerequisites

- The lpfc and the lpfcdfc drivers installed.

### Installing HBAnyware and lputil

To install HBAnyware and lputil:

1. Log on as root.
2. Copy the elxlinuxapps-<DriverRev>.tar file to a directory on the install machine.
3. cd to the directory to which you copied the tar file.
4. Untar the file. Type:

```
tar xvf elxlinuxapps-<DriverRev>.tar
```

5. Run the install script. Type:

```
./install
```

## Installing the HBAnyware Security Configurator

Follow these instructions to install the HBAnyware Security Configurator on your system. The install script is located in /usr/sbin/hbanyware directory.

### Prerequisites

- The lpfc and the lpfcdfc drivers installed.
- HBAnyware version 2.0a20 installed on the system for both driver versions.

### Installing the HBAnyware Security Configurator

To install the HBAnyware Security Configurator utility:

1. su to root.
2. Run the install script with the "ssc" argument. Type:

```
./install ssc
```





## **Emulex Driver for Linux Configuration Manual**

### **Version 7.1**

### **Table of Contents**

- [Introduction](#)
  - [Start HBAnyware](#)
  - [Use HBAnyware](#)
  - [Use HBAnyware Command-Line Interface](#)
  - [Start lputil](#)
- [Discover HBAs](#)
  - [Using HBAnyware](#)
  - [Using lputil](#)
- [Reset HBAs](#)
  - [Using HBAnyware](#)
  - [Using lputil](#)
- [View Adapter Information](#)
  - [Using HBAnyware](#)
    - [Display HBAs](#)
    - [View Discovered Elements](#)
    - [View Host Attributes](#)
    - [View Fabric Attributes](#)

- [View Target Attributes](#)
  - [View LUN Attributes](#)
  - [View General HBA Attributes](#)
  - [View Detailed HBA Attributes](#)
  - [View Port Attributes](#)
  - [View Port Statistics](#)
- [Using lputil](#)
- [Update Firmware](#)
  - [Using HBAnyware](#)
  - [Using lputil](#)
- [FC Boot](#)
  - [Update BootBIOS](#)
  - [Enable BootBIOS](#)
  - [Update EFIBoot](#)
  - [Load EFIBoot Using HBAnyware](#)
  - [Boot the EFI System](#)
- [Configuring the Driver Parameters](#)
  - [Using HBAnyware](#)
  - [Using lpfc.conf](#)
  - [Creating a New Initial Ramdisk Image](#)
- [Set Up LUN Support](#)
- [Dynamically Add LUNs and Targets](#)
- [Understand Device Numbering](#)
- [Download PCI Configuration](#)
- [View the lpfc.conf Configuration File](#)
- [Using the devlabel Tool](#)
- [Set Up Persistent Bindings](#)
  - [Using HBAnyware](#)

## HBAnyware Security

- [Security Overview](#)

- [Start the HBAnyware Security Configurator](#)

- [Run the Configurator for the First Time](#)

- [Designate an MSC](#)

### Access Control Groups

- [Introduction](#)

- [Create the ACG](#)

- [Add a Server to the ACG](#)

- [Delete a Server from the ACG](#)

- [Remove Security from All Servers in the ACG](#)

- [Generate New Security Keys](#)

- [Restore the ACG to Its Last Saved Configuration](#)

- [Access a Switch](#)

### Access Sub-Groups

- [Introduction](#)

- [Create an ASG](#)

- [Reserved Indices](#)

- [Add a Server to an ASG](#)

- [Delete an ASG](#)

- [Restore an ASG to Its Last Saved Configuration](#)

- [Edit an ASG](#)

- [Offline ASGs](#)

### Backup Masters

- [Introduction](#)

- [Create a Backup Master](#)

- [Reassign a Backup Master as the New MSC from the Old MSC](#)

- [Reassign a Backup Master as the New MSC from the Backup Master](#)

## Introduction

The Emulex driver for Linux has many options that can be modified to provide for different behavior. You can change these options using the HBAnyware™ utility or the lputil™ utility.

- The HBAnyware utility is a Java-based, user friendly graphical environment. Use HBAnyware to do any of the following:
  - Discover HBAs
  - Reset HBAs
  - Sort HBAs
  - Set up persistent binding
  - Set driver parameters
  - Update firmware on the local HBA or on remote HBAs
- The LightPulse utility (lputil) is a command-line interface. Use lputil to do any of the following:
  - Download PCI configuration data files
  - Discover HBAs
  - Reset HBAs
  - Update firmware on the local HBA
  - Update x86 BootBIOS
  - Enable the x86 BootBIOS message

**Note** HBAnyware's rmserver must be running on all remote hosts that are to be discovered and managed.

Remote capabilities of HBAnyware are subject to fabric zoning configuration. Remote hosts to be discovered and managed by HBAnyware must be in the same zone.

## Start HBAnyware for Linux

### To start HBAnyware for Linux:

1. su to root.
2. Run the script:

```
/usr/sbin/hbanyware/hbanyware
```

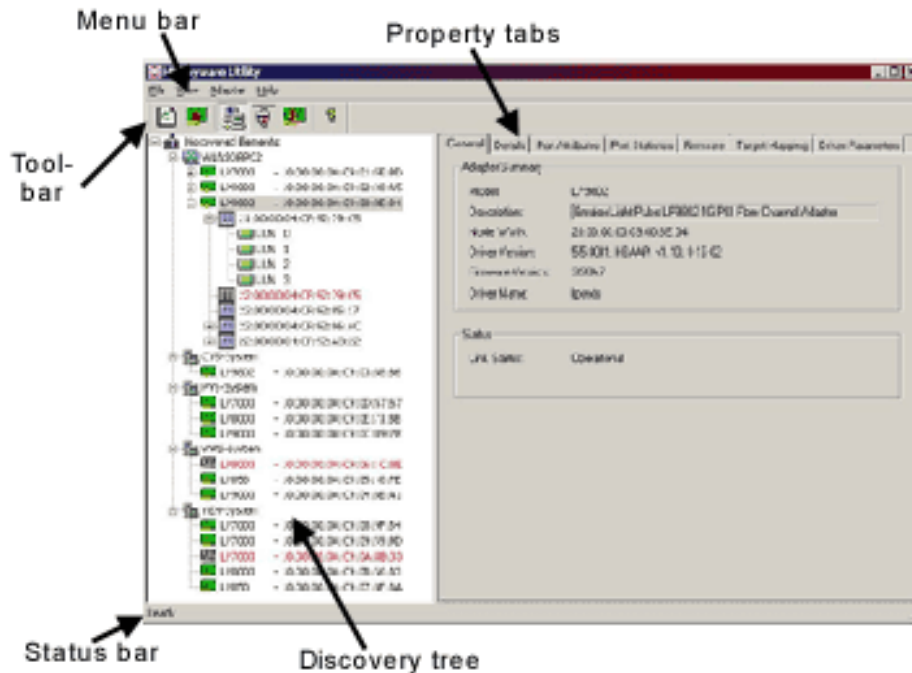
### To start the HBAnyware Security Configurator for Linux:

1. su to root.
2. Run the script:

```
/usr/sbin/hbanyware/ssc
```

## Use HBAAnyware

The HBAAnyware window contains five basic components: the menu bar, the toolbar, the discovery tree, the property tabs and the status bar.



**Note** The element you select in the discovery tree determines whether a menu item or toolbar icon is active. For example, if you select the local host or other system host, the Reset Adapter item on the Adapter menu is unavailable. The Reset Adapter toolbar button is unavailable as well.

**Note** The appearance of HBAAnyware screens may vary slightly depending upon the operating system in use.

### The Menu Bar

The menu bar contains command menus that enable you to perform a variety of tasks such as exiting HBAAnyware, resetting host bus adapters and sorting items in the discovery tree view. Many of the menu bar commands are also available from the toolbar.

## The Toolbar

The toolbar contains buttons that enable you to refresh the discovery tree view, reset the selected host bus adapter and sort the discovery tree view. Many of the toolbar functions are also available from the menu bar.



The toolbar is visible by default. Use the Toolbar item in the View menu to hide the toolbar. If the item is checked, the toolbar is visible.

## The Toolbar Buttons

The toolbar buttons perform the following tasks:



Click the Rediscover button to refresh the discovery tree display.



Click the Reset button to reset the selected host bus adapter.

### Sort Toolbar Buttons

Discovered adapters can be sorted by host name, fabric addresses or by local HBAs. By default, adapters are sorted by host name, with local HBAs appearing first.

Sorting is performed in ascending order and recognizes letters, numbers, spaces and punctuation marks.



The Group HBAs by Host Name button (default)

- Initially sorts by host name. Host names cannot be changed using HBAnyware. Names must be changed locally on that system.
- Within each host system, sorts by HBA model.
- If there are multiple HBAs with the same model number, the models are sorted by world wide node name.

- If there are targets present, they are sorted by world wide port name. Multiple HBAs can reference the same target.
- If there are LUNs present, they are sorted by LUN number.



The Group HBAs by Fabric Address button

- Initially sorts by fabric ID.
- Within each fabric ID, sorts by HBA model.
- If there are multiple HBAs that have the same model number, the models are sorted by world wide node name.
- If there are targets present, they are sorted by world wide port name. Multiple HBAs can reference the same target.
- If there are LUNs present, they are sorted by LUN number.
- If the fabric ID is all zeros, there is no fabric attachment.



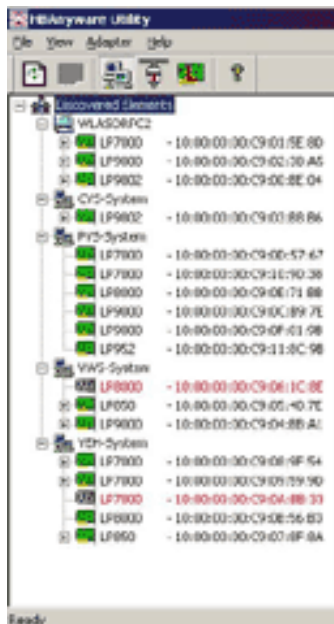
The Local HBAs Only button

- Sorts by the HBA's local or remote location and is either on or off. Works in conjunction with the Group HBAs by Host Name and Group HBAs by Fabric Address buttons.

## The Discovery Tree

The discovery tree (left pane) displays icons representing discovered network (SAN) elements (local host name, system host names and all host bus adapters that are active on each host). Targets and LUNs, when present, are also displayed.





## Discovery Tree Icons

Discovery tree icons represent the following:



The local host.



Other hosts connected to the system.



A green HBA icon with black descriptive text represents an HBA that is online.



A gray HBA icon with red descriptive text represents an HBA that is offline or otherwise temporarily inaccessible. Several situations could cause the HBA to be offline or inaccessible:

- The HBA on a local host is not connected to the network but is still available for local access.
- The HBA on a local host is malfunctioning and is inaccessible to the local host as well as to the network.
- The HBA on a local host is busy performing a local firmware download and is temporarily inaccessible to the local host as well as to the network.



The Target icon represents connections to individual storage devices.

## Property Tabs

The property tabs display configuration, statistical and status information for network elements. The set of available tabs is context-sensitive, depending on the type of network element or HBA currently selected in the discovery tree.

## Status Bar

As you navigate through the menu bar or the toolbar, help messages appear on the status bar near the bottom of the HBAnyware window.

The status bar is visible by default. Use the Status Bar item in the View menu to hide the status bar. If the item is checked, the status bar is visible.

## Use HBAnyware Command-Line Interface

The CLI (command-line interface) Client component of HBAnyware provides access to the capabilities of the Remote Management library from a console command prompt. This component is intended for use in scripted operations from within shell scripts, batch files, or the specific platform equivalent.

**Note** HBAnyware must be running on all remote hosts that are to be discovered and managed.

Remote capabilities of HBAnyware are subject to fabric zoning configuration. Remote hosts to be discovered and managed by HBAnyware must be in the same zone.

### Using the CLI Client

The CLI Client is a console application named HBACMD. Each time you run this application from the command line, a single operation is performed.

The first parameter of this command is the requested operation. When the specified operation is completed, the command prompt is displayed. Most operations retrieve information about an entity on the SAN and display that information on the console.

Most of the CLI Client commands require one or more additional parameters that specify the nature of the command. A parameter used by many HBACMD commands specifies the World Wide Node Name of the host bus adapter (HBA) that is the target of the command. For example, the following command displays the port attributes for the HBA with the specified World Wide Node Name:

```
/usr/sbin/hbanyware/hbacmd portattrib 10:00:00:00:c9:20:20:20
```

Entering `/usr/sbin/hbanyware/hbacmd <no qualifiers>` displays a list of command options.

### CLI Client Command Reference

#### Version

Syntax	<code>./hbacmd VERSION</code>
Description	The current version of the HBAnyware CLI Client application.
Parameters	N/A

## List HBAs

Syntax	<code>./hbacmd LISTHBAS</code>
Description	A list of the discovered manageable Emulex HBAs and their World Wide Node Names.
Parameters	N/A

## Display HBA Attributes

Syntax	<code>./hbacmd HBAAttrib &lt;wwpn&gt;</code>
Description	A list of attributes for the HBA with the specified World Wide Node Name.
Parameters	<code>wwpn</code> The World Wide Port Name of the HBA. The HBA can be either local or remote.

## Port Attributes

Syntax	<code>./hbacmd PortAttrib &lt;wwpn&gt;</code>
Description	A list of attributes for the port with the specified World Wide Port Name.
Parameters	<code>wwpn</code> The World Wide Port Name of the port. This port can be either local or remote.

## Port Statistics

Syntax	<code>./hbacmd PortStat &lt;wwpn&gt;</code>
Description	A list of statistics for the port with the specified World Wide Port Name.
Parameters	<code>wwpn</code> The World Wide Port Name of the port. The port can be either local or remote.

## Server Attributes

Syntax	<code>./hbacmd ServerAttrib &lt;wwpn&gt;</code>
Description	A list of attributes for the specified server.
Parameters	<p><code>wwpn</code> The World Wide Port Name of the HBA that is the target of the firmware download. The HBA can be either local or remote.</p>

## Download

Syntax	<code>./hbacmd DOWNLOAD &lt;wwpn&gt; &lt;filename&gt;</code>
Description	Loads the specified firmware image to the (HBA) with the specified WWNN.
Parameters	<p><code>wwpn</code> The World Wide Port Name of the HBA that is the target of the firmware download. The HBA can be either local or remote.</p> <p><code>filename</code> The pathname of the firmware image that is to be loaded. This can be any file that is accessible to the CLI client application, but we recommend that you keep image files in the Emulex Repository folder or directory.</p>

## Reset Adapter

Syntax	<code>./hbacmd RESET &lt;wwpn&gt;</code>
Description	Resets the HBA with the specified World Wide Port Name.
Parameters	<p><code>wwpn</code> The World Wide Port Name of the port. The port can be either local or remote.</p>

## Target Mapping

Syntax	<code>./hbacmd TargetMapping &lt;wwpn&gt;</code>
Description	A list of mapped targets for the port with the specified World Wide Port Name.
Parameters	<p><code>wwpn</code> The World Wide Port Name of the port. The port can be either local or remote.</p>

## Persistent Binding

Syntax	<code>./hbacmd PersistentBinding &lt;wwpn&gt; &lt;source&gt;</code>		
Description	This function returns a list of the current persistent binding data associated with the HBA specified by ObjectPort. The data may be retrieved either from the driver itself (live), or from a configuration file.		
Parameters	wwpn	The World Wide Port Name of the port. The port can be either local or remote.	
	Source	Either C or L. C = Configuration. L = Live.	

## All Node Info

Syntax	<code>./hbacmd AllNodeInfo &lt;wwpn&gt;</code>		
Description	This functions retrieves target information for all targets that are visible to the specified HBA. This includes all automapped, persistently-bound, and unmapped targets. Because this function returns information for any unmapped targets, it is a more inclusive call than Persistent Binding.		
Parameters	wwpn	The World Wide Port Name of the port. The port can be either local or remote.	

## Set Persistent Binding

Syntax	<code>./hbacmd SetPersistentBinding &lt;wwpn&gt; &lt;scope&gt; &lt;bindtype&gt; &lt;id&gt; &lt;scsibus&gt; &lt;scsitarget&gt;</code>		
Description	Creates a persistent binding between an FCP target and OS SCSI information.		
Parameters	wwpn	The World Wide Port Name of the port. The port can be either local or remote.	
	Scope	P, I, or B. P = Bind set permanently. I = Bind set immediately. B = Bind set immediately and at reboot.	
	BindType	D, P, or N. D = Enable binding by D_ID. P = Enable binding by WWPN. N = Enable binding by WWNN.	
	ID	Either WWPN, WWNN, or D_ID (depending on BindType).	

## Remove All Persistent Bindings

Syntax	<code>./hbacmd RemoveAllPersistentBinding &lt;wwpn&gt;</code>
Description	Removes all persistent bindings for the specified HBA. Only the configured bindings can be removed; rebooting is required to remove a live bindings.
Parameters	<b>wwpn</b> The World Wide Port Name of the port. The port can be either local or remote.

## Remove Persistent Binding

Syntax	<code>./hbacmd RemovePersistentBinding &lt;wwpn&gt; &lt;bindtype&gt; &lt;id&gt; &lt;scsibus&gt; &lt;scsitarget&gt;</code>
Description	Removes a selected persistent binding. Only the configured bindings can be removed; rebooting is required in order to remove a live binding.
Parameters	<b>wwpn</b> The World Wide Port Name of the port. The port can be either local or remote. <b>BindType</b> D, P, or N. D = Enable binding by D_ID. P = Enable binding by WWPN. N = Enable binding by WWNN. <b>ID</b> Either WWPN, WWNN, or D_ID (depending on BindType).

## Binding Capabilities

Syntax	<code>./hbacmd BindingCapabilities &lt;wwpn&gt;</code>
Description	The flags returned by this function represent all binding capabilities present in the HBA specified by ObjectPort.
Parameters	<b>wwpn</b> The World Wide Port Name of the port. The port can be either local or remote.

## Binding Support

Syntax	<code>./hbacmd BindingSupport &lt;wwpn&gt; &lt;source&gt;</code>
Description	This function returns the subset of capabilities that is currently active on the specified HBA.
Parameters	<b>wwpn</b> The World Wide Port Name of the port. The port can be either local or remote. <b>Source</b> Either C or L. C = Configuration. L = Live.

## Set Binding Support

Syntax	<code>./hbacmd Set Binding Support &lt;wwpn&gt; &lt;bindflag&gt;</code>
Description	This function installs a set of active capabilities in the specified HBA.
Parameters	<p><b>wwpn</b> The World Wide Port Name of the port. The port can be either local or remote.</p> <p><b>BindFlag</b> D, P, N, A, DA, Pa, or NA. D = Enable binding by D_ID. P = Enable binding by WWPN. N = Enable binding by WWNN. A = Enable binding by AUTOMAP. DA = Enable binding by D_ID and AUTOMAP. PA = Enable binding by WWPN and AUTOMAP. NA = Enable binding by WWNN and AUTOMAP.</p>

## Driver Parameters

Syntax	<code>./hbacmd DriverParams &lt;wwpn&gt;</code>
Description	This function returns the driver parameters array of the specified HBA. Each entry in the array contains the parameter name and values for minimum value, maximum value, current value, and default value.
Parameters	<p><b>wwpn</b> The World Wide Port Name of the port. The port can be either local or remote.</p>

## Set Driver Parameters

Syntax	<code>./hbacmd SetDriverParams &lt;wwpn&gt; &lt;ctrlword&gt; &lt;param&gt; &lt;value&gt;</code>
Description	This function is used to assign a value to a member of the Driver Parameters array belonging to the HBA referenced by ObjectPort. Only one parameter can be set for each call to this function.
Parameters	<p><b>wwpn</b> The World Wide Port Name of the port. The port can be either local or remote.</p> <p><b>ctrlword</b> P, G, B or N. P = Permanent. G = Global. B = Both. N = Neither</p>



## Reset Driver Parameters

Syntax	<code>./hbacmd ResetDriverParams &lt;wwpn&gt; &lt;ctrlword&gt; &lt;param&gt; &lt;value&gt;</code>
Description	This function resets to the installed default values, all parameters' current values on the HBA specified by ObjectPort.
Parameters	<p><code>wwpn</code> The World Wide Port Name of the port. The port can be either local or remote.</p> <p><code>ctrlword</code> P, G, B or N. P = Permanent. G = Global. B = Both. N = Neither</p>

## Set Boot Bios

Syntax	<code>./hbacmd SetBootBios &lt;wwpn&gt; &lt;ctrlword&gt;</code>
Description	This function is used to enable/disable a boot bios firmware file that is present on an HBA. When you download a firmware file which has a boot bios file attached, you have an option to enable or disable this boot file, depending upon the current state of this boot file.
Parameters	<p><code>wwpn</code> The World Wide Port Name of the port. The port can be either local or remote.</p> <p><code>ctrlword</code> E or D. E = Enable. D = Disable.</p>

## Start lputil

The LightPulse Utility (lputil) is loaded automatically when the driver utilities kit is installed.

Start the utility by entering the complete path to lputil. The path reflects the default installation path. If the installation path changed, you will need to adjust the command appropriately.

```
/usr/sbin/lpfc/lputil
```

## Discover HBAs - Introduction

You can discover adapters using either HBAnyware or lputil.

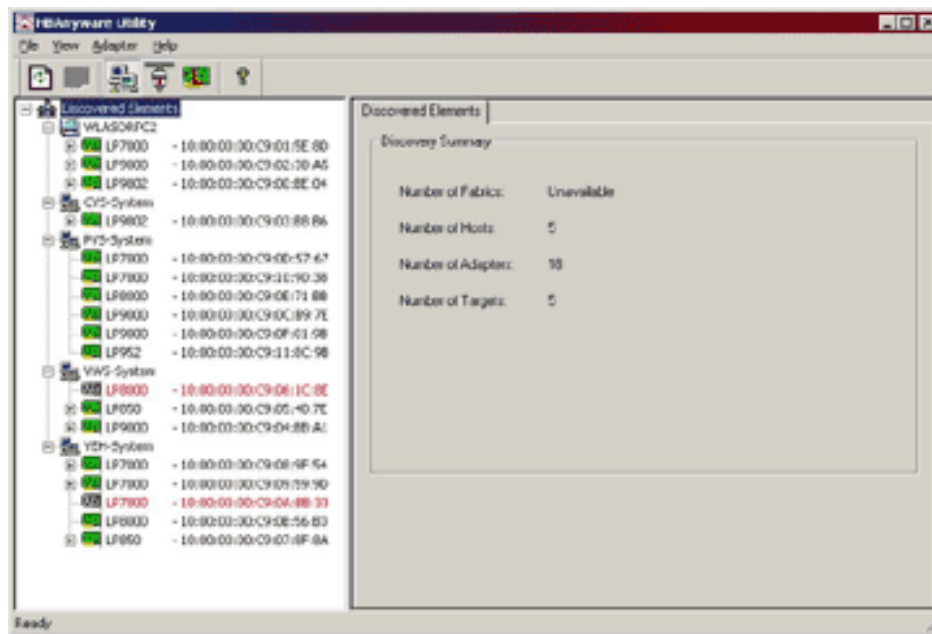
- HBAnyware allows you to discover both local and remote adapters.
- lputil allows you to discover local adapters only.

## Discover HBAs Using HBAnyware

Local and remote host bus adapters (HBAs) are discovered automatically when you launch HBAnyware.

**Note** HBAnyware must be installed and the rmserver process (es) must be running on all remote hosts that are to be discovered and managed.

Remote capabilities of HBAnyware are subject to fabric zoning configuration. Remote hosts to be discovered and managed by HBAnyware must be in the same zone.



## List Adapters using lputil

When you start the LightPulse Utility (lputil), all adapters are listed with information such as the host adapter number, instance number (i.e. lpfc0), board model type, whether it is a standard or non-standard device and whether the adapter is ready to use.

From the Main menu, enter 1, List Adapters.

### MAIN MENU

- 1. List Adapters
- 2. Adapter Information
- 3. Firmware Maintenance
- 4. Reset Adapter
- 0. Exit

Enter choice => 1


## Reset Adapter - Introduction

You can reset adapters using either HBAnyware or lputil.

- HBAnyware allows you to reset remote and local adapters.
- lputil allows you to reset local adapters only.

## Reset HBAs Using HBAnyware

To reset a host bus adapter, do the following:

1. Start HBAnyware.
2. In the directory tree, click the HBA you want to reset.
3. Do one of the following:
  - From the menu bar, click Adapter, and then click Reset Adapter.
  - Click the Reset toolbar button. 

## Reset Adapter Using Iputil

The LightPulse utility (lputil) allows you to reset the adapter.

To reset the adapter using lputil:

1. Start lputil. The Main menu is displayed.
2. Choose #4 Reset Adapter.
3. If you have multiple adapters, select the adapter you want to reset.

Resetting the adapter runs self tests and reestablishes links (causes discovery of devices). Once the adapter has been successfully reset, the Main menu is displayed.

**Caution** Do not reset your adapter while copying or writing files. This could result in data loss or corruption. We recommend contacting Emulex Technical Support before resetting your adapter.



## View HBA Information - Introduction

You can view adapter information using either HBAnyware or lputil.

- HBAnyware allows you to view remote and local adapters.
- lputil allows you to view local adapters only.

## View HBA Information using HBAnyware

Using HBAnyware you can sort the way HBA's are displayed and view information about hosts, targets, fabrics, LUNs, ports, and more.

## Display HBAs

Using HBAnyware, you can sort the way discovered adapters are displayed. You can sort adapters by host name, fabric name, adapter name, target name, and LUN name.

You can also choose to view local HBAs or remote HBAs. By default, both local and remote HBAs are displayed by host name/fabric name.

### Sort by Host Name

- Initially sorts by host name. Host names cannot be changed using HBAnyware; names must be changed locally on that system.
- Within each host system, sorts by HBA model.
- If multiple HBAs have the same model number, sorts models by world wide node name.
- If targets are present, sorts by world wide port name. Multiple HBAs may refer to the same target.
- If LUNs are present, sorts by LUN name.

### Sort by Fabric Address

- Initially sorts by fabric ID.
- Within each fabric ID, sorts by HBA model.
- If multiple HBAs have the same model number, sorts models by world wide node name.
- If targets are present, sorts by world wide port name. Multiple HBAs may refer to the same target.
- If LUNs are present, sorts by LUN name.
- If the fabric ID is all zeros, no fabric attachment is present.

To sort adapters:

1. Start HBAnyware.
2. Switch between host name or fabric ID in one of two ways:

- From the menu bar: click View, then select Sort by Host Name or Sort by Fabric ID. The current adapter display mode is checked.
- From the toolbar, click one of the following buttons:



Sort by host name (default).




Sort by fabric ID.

3. HBAnyware sorts in ascending order. The sort recognizes letters, numbers, spaces and punctuation marks.

## Display Local HBAs Only

Displays local host name or fabric address.

To display local HBAs only:

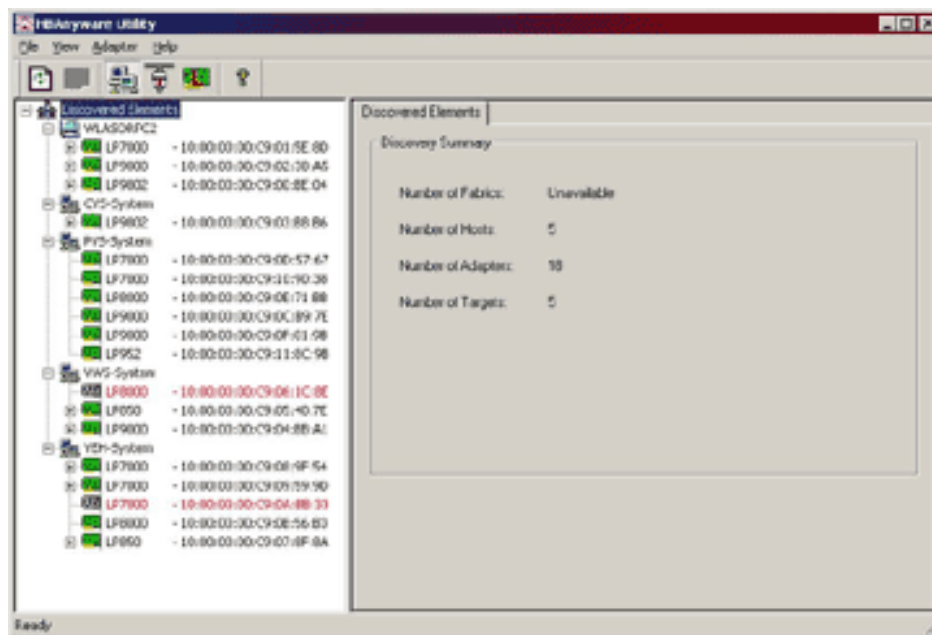
1. Start HBAnyware.
2. Display local HBAs only in one of two ways:
  - From the menu bar: click View, then select Local HBAs Only. The current adapter display mode is checked.
  - From the toolbar, click  Display Local HBAs Only.

## View Discovered Elements

The Discovered Elements tab in HBAnyware contains a general summary of the discovered elements. The Discovered Elements node is the root of the discovery tree, but it does not represent a specific network element. Expanding it will reveal all hosts, LUNs, targets and adapters that are visible on the SAN.

To view the discovered elements, do the following:

1. Start HBAnyware.
2. Click Discovered Elements in the discovery tree.



## Field Definitions

Number of Fabrics - the total number of fabrics discovered.

Number of Hosts - the total number of host computers discovered. This includes servers, workstations, personal computers, multiprocessors and clustered computer complexes.

Number of Adapters - the total number of host bus adapters (HBAs) discovered.

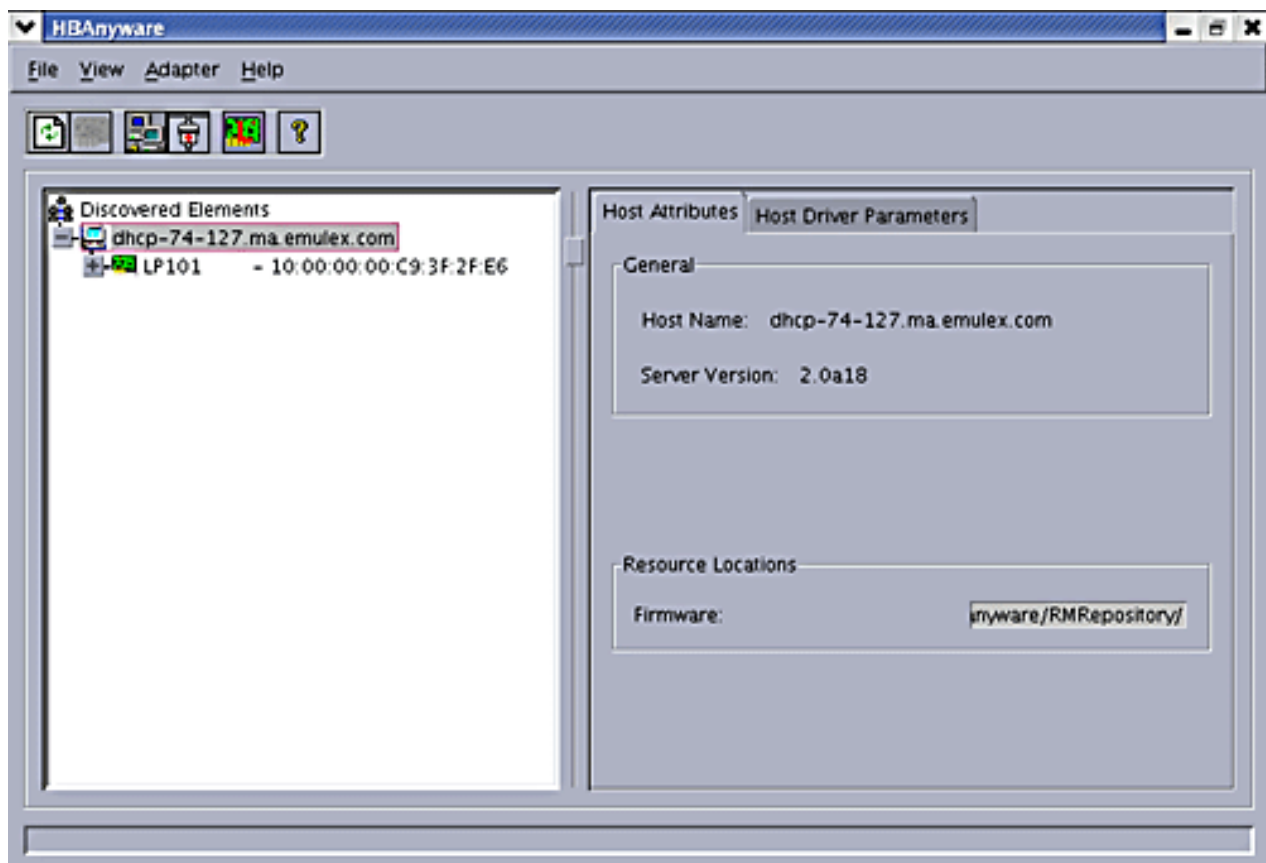
Number of Targets - the total number of unique targets discovered on the SAN. In the discovery tree, the same target can appear under more than one HBA.

## View Host Attributes

The Host Attributes tab in HBAnyware contains information specific to the selected host.

To view the host attributes, do the following:

1. Start HBAnyware.
2. Do one of the following:
  - From the menu bar, click View, then click Group HBAs by Host Name.
  - From the toolbar, click the  button.
3. Click a host name in the discovery tree.



## General Area Field Definitions

Host Name - the name of the host.

Server Version - the version number of the utility in use.


## **Resource Location Field Definitions**

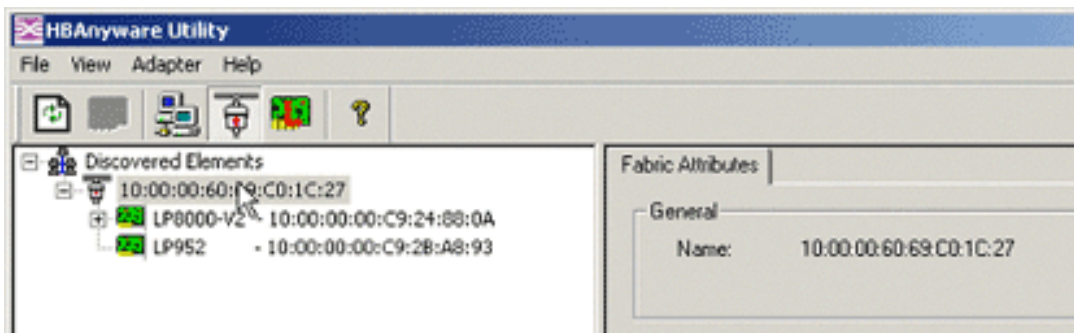
Firmware - the directory path where the firmware image files are moved prior to being downloaded to the HBAs on that host.

## View Fabric Attributes

The Fabric Attributes tab in HBAnyware contains information specific to the selected fabric.

To view the fabric attributes, do the following:

1. Start HBAnyware.
2. Do one of the following:
  - From the menu bar, click View, then click Group HBAs by Fabric Address.
  - From the toolbar, click the  button.
3. Click on a fabric address in the discovery tree.



## General Area Field Definitions

Name - a 64-bit unique identifier assigned to each Fibre Channel fabric.

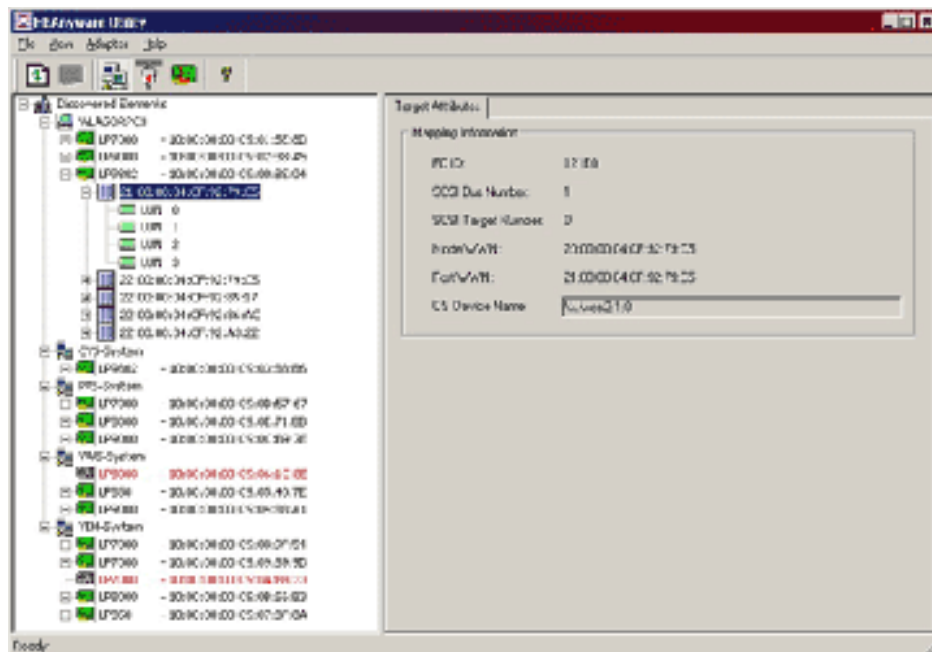


## View Target Attributes

The Target Attributes tab in HBAAnyware contains information specific to the selected target.

To view target attributes, do the following:

1. Start HBAAnyware.
2. Do one of the following:
  - From the menu bar, click View, then click Sort by Host Name.
  - From the toolbar, click the  button.
3. Click a target in the discovery tree.



## Target Attributes Field Definitions

### Vendor/Product Information

FC ID - the Fibre Channel ID for the target; assigned automatically in the firmware.

SCSI Bus Number - defines the SCSI bus to which the target is mapped.

SCSI Target Number - the target's identifier on the SCSI bus.

Node WWN - the unique 64-bit number, in hexadecimal.

Port WWN - the unique 64-bit number, in hexadecimal.


OS Device Name - operating system device name.

## View LUN Attributes

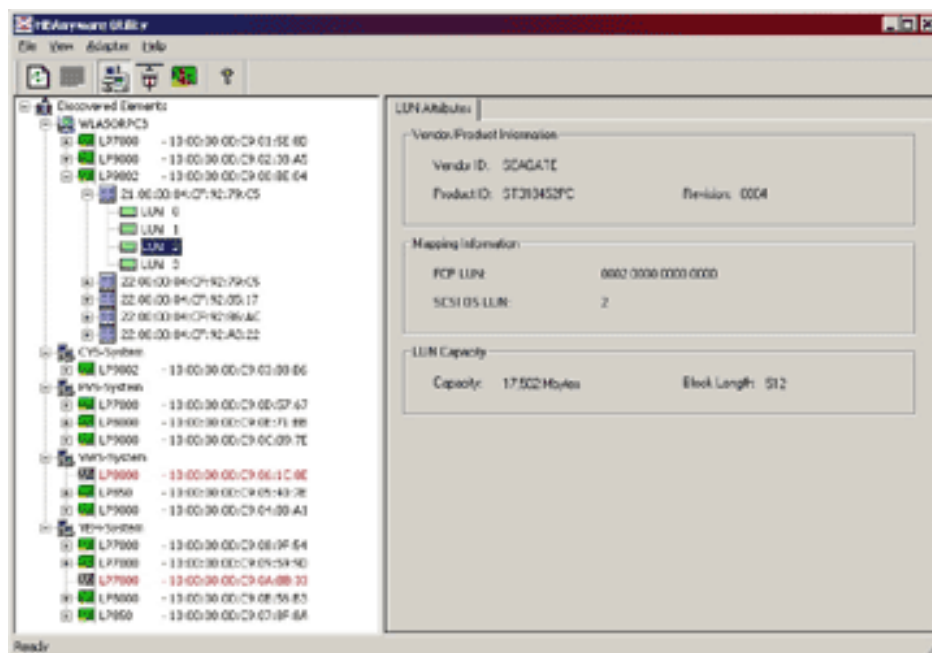
The LUN Attributes tab in HBAnyware contains information specific to the selected logical unit number (LUN).

To view the LUN attributes, do the following:

1. Start HBAnyware.
2. Do one of the following:
  - From the menu bar, click View, then click Group HBAs by Host Name.

- From the toolbar, click the  button.

3. Click a LUN in the discovery tree.



## LUN Attributes Field Definitions

### Vendor Product Information

Vendor ID - the name of the vendor of the logical unit.

Product ID - the vendor-specific ID for the logical unit.

Revision - the vendor-specific revision number for the logical unit.

### **Mapping Information**

FCP LUN - the Fibre Channel identifier used by the host bus adapter (HBA) to map to the SCSI OS LUN.

SCSI OS LUN - the SCSI identifier used by the operating system to map to the specific LUN.

### **LUN Capacity**

Capacity - the capacity of the logical unit, in megabytes.

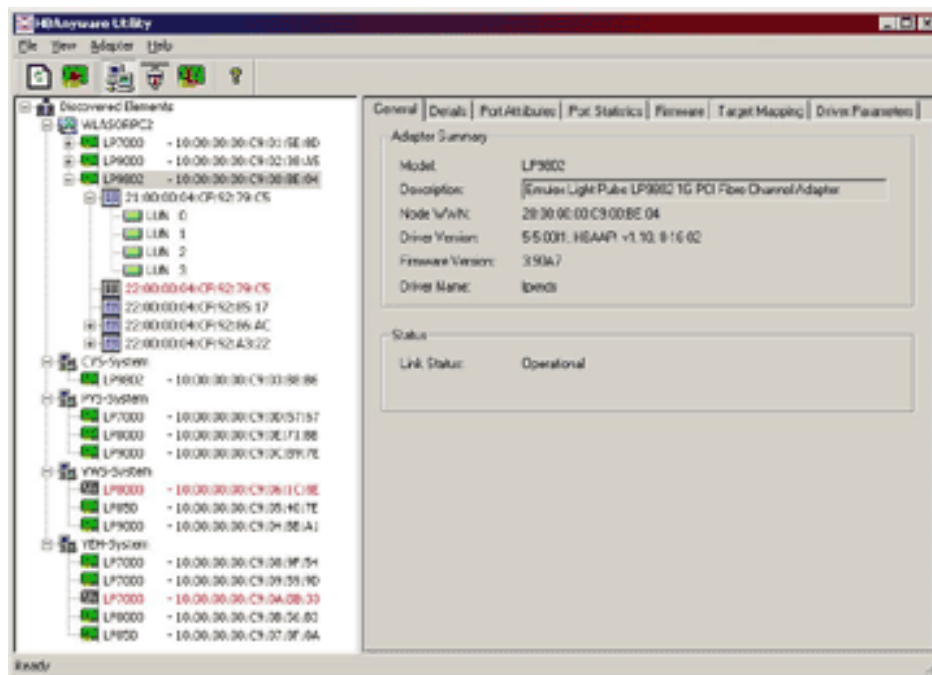
Block Length - the length of a logical unit block in bytes.

## View General HBA Attributes

The General tab in HBAnyware contains general attributes associated with the selected host bus adapter (HBA).

To view general attributes, do the following:

1. Start HBAnyware.
2. If desired, sort the discovered HBAs.
3. Click an HBA in the discovery tree.



## Adapter Summary Field Definitions

**Model** - the Emulex HBA model number.

**Description** - a formal description of the HBA, including model number, bus type and link speed. This field is recessed, indicating that the information in this field may exceed the visible length of the field. Use the arrow keys on your keyboard to scroll and view additional information.

**Node WWN** - a 64-bit worldwide unique identifier assigned to the node.

**Driver Version** - the driver version number and the HBA application programming interface (HBA API) version number.

**Firmware Version** - the version of Emulex firmware currently active on the HBA.

**Driver Name** - the executable file image name for the driver as it appears in the Emulex driver download package.

**Host Name (Linux only)** - the name of the host to which the driver was downloaded.

## Link Status Area

This field reflects the current state of the HBA. There are several possible states:

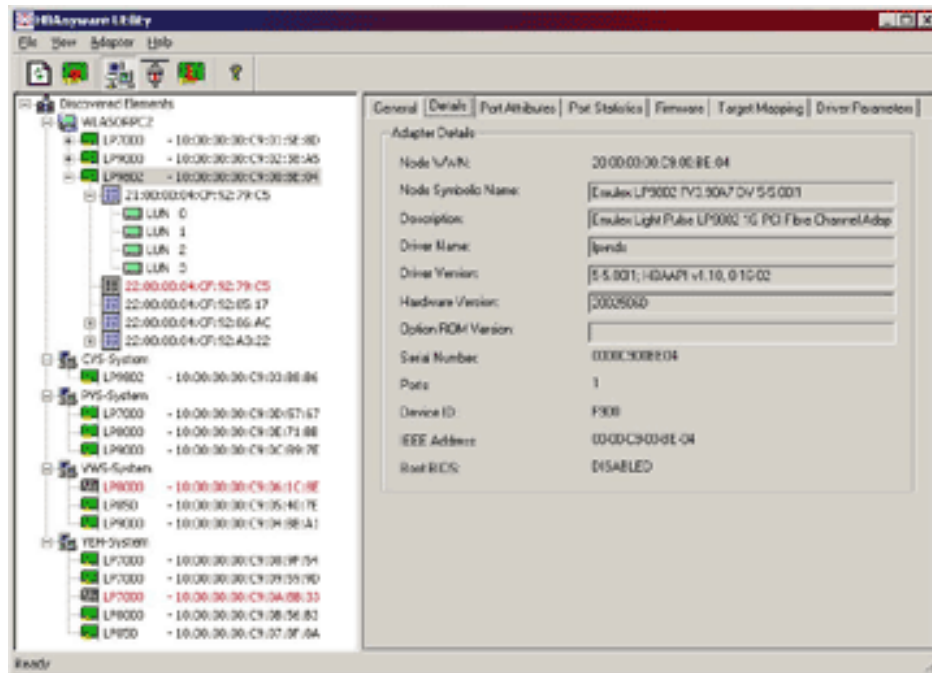
- The operational state indicates that the HBA is connected to the network and operating normally.
- All other states indicate that the HBA is not connected to the network. Gray HBA icons with red descriptive text indicate that the HBA is offline. These offline states are:
  - User offline - the adapter is down or not connected to the network.
  - Bypassed - the HBA is in Fibre Channel discovery mode.
  - Diagnostic Mode - the HBA is controlled by a diagnostic program.
  - Link Down - there is no access to the network.
  - Port Error - the HBA is in an unknown state; try resetting it.
  - Loopback - an FC-1 mode in which information passed to the FC-1 transmitter is shunted directly to the FC-1 receiver. When a Fibre Channel interface is in loopback mode, the loopback signal overrides any external signal detected by the receiver.
  - Unknown - the HBA is offline for an unknown reason.
  - Resetting - the HBA is in the process of rebooting.
  - Downloading - a firmware or other image is being downloaded to the HBA.

## View Detailed HBA Attributes

The Details tab in HBAnyware contains detailed attributes associated with the selected HBA.

To view the detailed attributes, do the following:

1. Start HBAnyware.
2. If desired, sort the discovered HBAs.
3. Click an HBA in the discovery tree. The General tab is displayed.
4. Click the Details tab.



**Note** Recessed fields indicate that the information in that field may exceed the text display area of the field. Use the arrow keys on your keyboard to scroll and view additional information.

## Adapter Details Field Definitions

- Node WWN - a 64-bit worldwide unique identifier assigned to the node.
- Node Symbolic Name - in a fabric, the name registered with the name server.

- Description - a formal description of the HBA, including model number, bus type and link speed.
- Driver Name - an executable file image name for the driver as it appears in the Emulex driver download package.
- Driver Version - the driver version number and the HBA application programming interface (HBA API) version number.
- Hardware Version - the board version number, represented by the JEDEC ID, which is machine-readable from the Emulex ASIC.
- Option ROM Version - the optional read-only memory version number; displayed if the BootBIOS bootup message is enabled on the HBA.
- Serial Number - the serial number assigned to the HBA when it was manufactured. Typically, this is a BCD string of the 48-bit IEEE address for the HBA.
- Ports - the number of ports on the HBA. Currently, this is always one. The two ports of dual-channel HBAs are displayed in the discovery tree as two HBAs.
- Device ID - the HBA's default device ID.
- IEEE Address - the Media Access Control (MAC) address is in conformance with the Fibre Channel Link Encapsulation (FC-LE) standard. This address is a 48-bit number that is unique to every HBA in existence. The IEEE Address is printed on a label affixed to one end of the HBA.
- Boot BIOS - the enabled/disabled status of the BootBIOS message on the HBA. This message is updated automatically if the status of the BootBIOS message changes (caused by downloading a different firmware image).

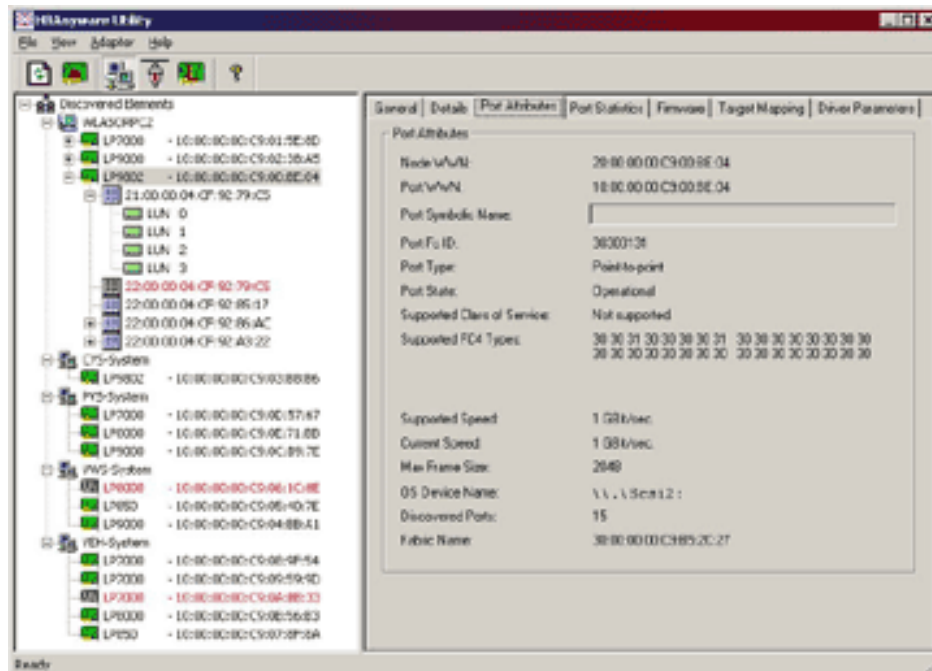


## View Port Attributes

The Port Attributes tab in HBAnyware contains information about the port on the selected host bus adapter (HBA).

To view port attributes, do the following:

1. Start HBAnyware.
2. If desired, sort the discovered HBAs.
3. Click an adapter in the discovery tree. The General tab is displayed.
4. Click the Port Attributes tab.



## Port Attributes Field Definitions

**Node WWN** - a 64-bit worldwide unique identifier assigned to the node. The Node WWN is communicated during the login and port discovery processes. This identifier stays with the entity for its lifetime.

**Port WWN** - a 64-bit worldwide unique identifier assigned to the port. The Port WWN is communicated during the login and port discovery processes. This identifier stays with the entity for its lifetime.

Port Symbolic Name - the name registered by the HBA with a name server. This field is recessed, indicating that the information in this field may exceed the visible length of the field. Use the arrow keys on your keyboard to scroll and view additional information.

Port Fc ID - Fibre Channel ID for the port.

Port Type - describes the current operational mode of the port.

Port State - current status of the port: operational or link down.

Supported Class of Service - a frame delivery scheme exhibiting a set of delivery characteristics and attributes. There are three classes of service.

- Class-1 provides a dedicated connection between a pair of ports with confirmed delivery or notification of nondelivery.
- Class-2 provides a frame switched service with confirmed delivery or notification of nondelivery.
- Class-3 provides a frame switched service similar to Class-2 but without notification of frame delivery or non-delivery.

Supported FC4 Types - a 256-bit (8-word) map of the FC-4 protocol types supported by the port. Each bit in the map corresponds to a Type value as defined by the Fibre Channel standards and contained in the Type field of the frame header.

Supported Speed - maximum link speed supported by the HBA.

Current Speed - link speed for the current session.

Max Frame Size - maximum frame size.

OS Device Name - the platform-specific name by which the HBA is known to the operating system.

Discovered Ports - number of facilities that provide Fibre Channel interface attachment.

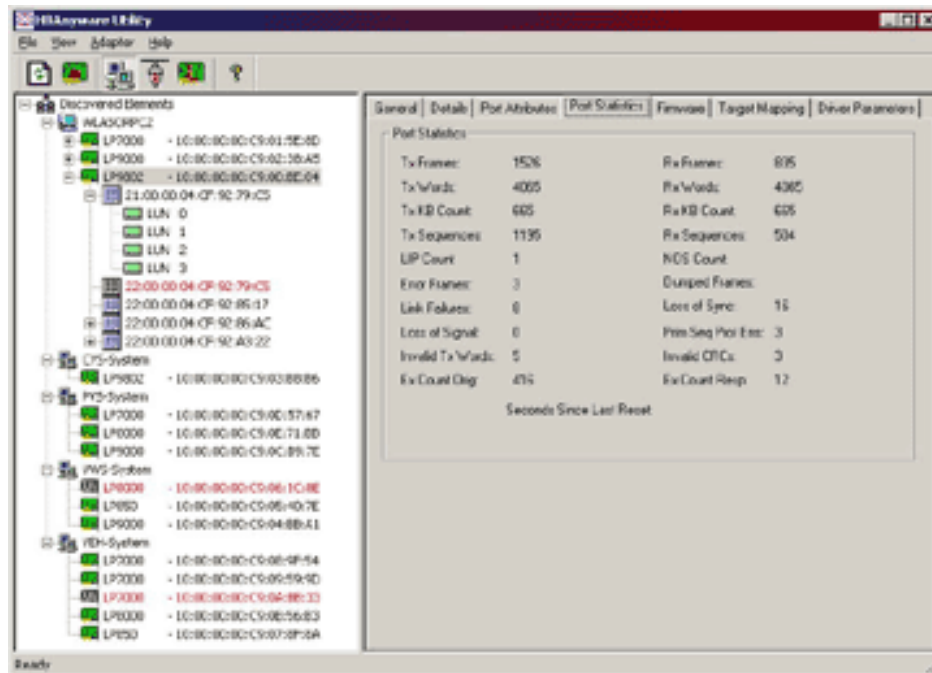
Fabric Name - 64-bit worldwide unique identifier assigned to the fabric.

## View Port Statistics

The Port Statistics tab in HBAnyware provides cumulative totals for various error events and statistics on the port. Statistics are cleared when the host bus adapter (HBA) is reset.

To view port statistics, do the following:

1. Start HBAnyware.
2. If desired, sort the discovered HBAs.
3. Click an HBA in the discovery tree. The General tab is displayed.
4. Click the Port Statistics tab.



## Port Statistics Field Definitions

**Tx Frames** - Fibre Channel frames transmitted by this HBA port.

**Tx Words** - Fibre Channel words transmitted by this HBA port.

**Tx KB Count** - Fibre Channel kilobytes transmitted by this HBA port.

**Tx Sequences** - Fibre Channel sequences transmitted by this HBA port.

LIP count - the number of loop initialization primitive (LIP) events that have occurred for the port. This field is not supported if the topology is not arbitrated loop. Loop initialization consists of the following:

- Temporarily suspend loop operations
- Determine whether loop capable ports are connected to the loop
- Assign AL\_PA IDs
- Provide notification of configuration changes and loop failures
- Place loop ports in the "monitoring" state

Error Frames - the number of frames received with cyclic redundancy check (CRC) errors.

Link Failures - the number of times the link failed. A link failure is a possible cause of a timeout.

Loss of Signal - the number of times the signal was lost.

Invalid Tx Words - the total number of invalid words transmitted by this HBA port.

Ex Count Orig - the number of Fibre Channel exchanges originating on this port.

Seconds Since Last Reset (Linux only) - the number of seconds since the port was last reset.

Rx Frames - the number of Fibre Channel frames received by this HBA port.

Rx Words - the number of Fibre Channel words received by this HBA port.

Rx KB Count - the received kilobyte count by this HBA port.

Rx Sequences - the number of Fibre Channel sequences received by this HBA port.

NOS count - this statistic is currently not supported for the SCSIport Miniport and Storport Miniport drivers, nor is it supported for arbitrated loop.

Dumped Frames - this statistic is not currently supported for the SCSIport Miniport driver, the Storport Miniport driver or the driver for Solaris and Linux.

Loss of Sync - the number of times loss of synchronization has occurred.

Prim Seq Prot Errs - the primitive sequence protocol error count. This counter is incremented whenever there is any type of protocol error.

Invalid CRCs - the number of frames received that contain CRC failures.

Ex Count Resp - the number of Fibre Channel exchange responses made by this port.

## View Adapter Information using lputil

The LightPulse Utility (lputil) allows you to view information for a selected adapter. Once you start lputil, the Main menu opens:

### MAIN MENU

1. List Adapters
2. Adapter Information
3. Firmware Maintenance
4. Reset Adapter
0. Exit

Enter choice => 2

Select choice #2.

### ADAPTER INFORMATION MENU

1. PCI Configuration Parameters
2. Adapter Revision Levels
3. Wakeup Parameters
4. IEEE Address
5. Loop Map
6. Status and Counters
7. Link Status
8. Configuration Parameters
0. Return to Main Menu

Enter choice =>

If you have multiple adapters, a list displays, you select an adapter and the Adapter Information Menu opens. If you have only one adapter, the Adapter Information Menu opens for that adapter.

**PCI Configuration Parameters** - Displays parameters from the PCI configuration space on the adapter. Examples of this information include vendor ID, device ID, base addresses, ROM address, header type, subclass and base class.

**Adapter Revision Levels** - Displays firmware revision levels, including kernel and overlay version information.

**Wakeup Parameters** - Displays BIOS status and version, as well as SLI (service level interface).

**IEEE Address** - Displays the adapter board address.

**Loop Map** - If you are currently using arbitrated loop topology, this menu option displays information about your connected devices, such as AL\_PA and D\_ID.

**Status and Counters** - Displays byte, frame, sequence and busy counts.

**Link Status** - Tracks activities such as link failure, loss of sync, and elastic overlay.

**Configuration Parameters** - Displays D\_ID topology, and timeout values for link failures and loss of sync.

## Update Firmware - Introduction

You can update firmware using either HBAnyware or lputil.

- HBAnyware allows you to update firmware on remote and local HBAs.
- lputil allows you to update firmware on local HBAs only.



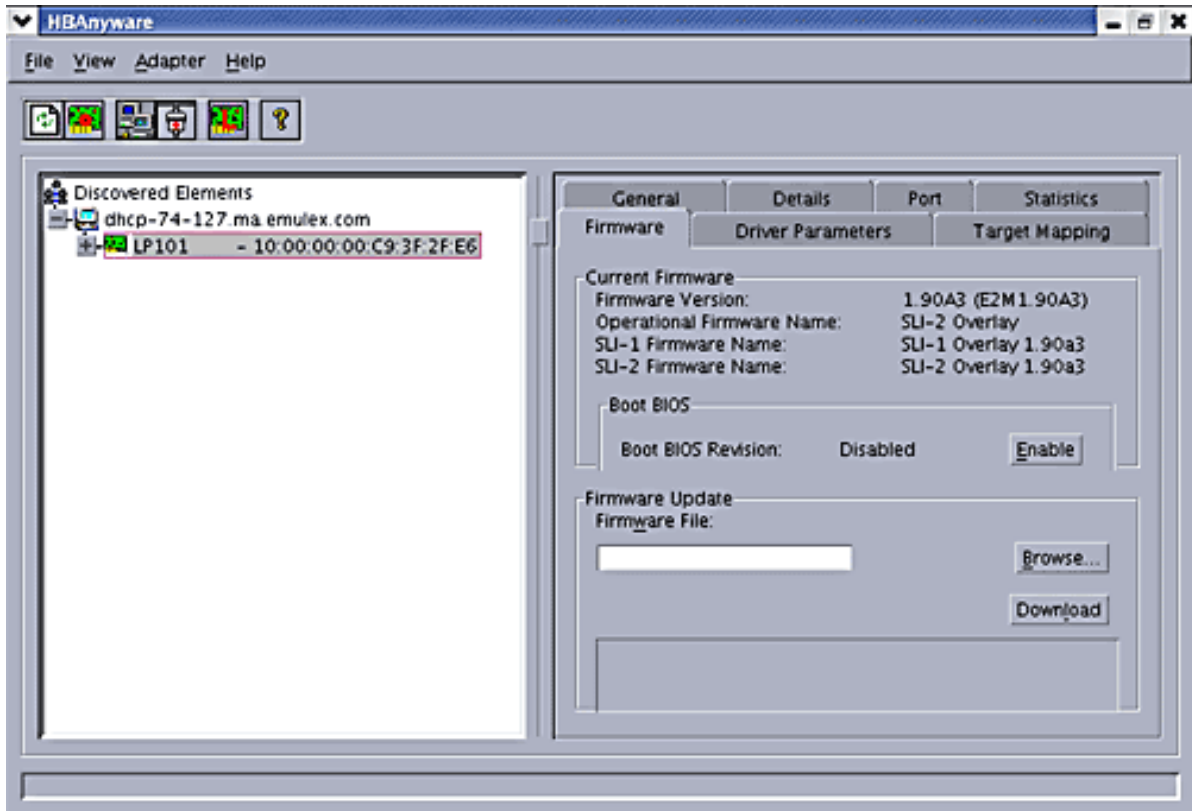
# Load Firmware Using HBAnyware

## Prerequisites

- One of the following drivers is installed properly:
  - SCSIport Miniport driver for Windows Server 2003, Windows 2000 or Windows NT
  - Storport Miniport driver for Windows Server 2003
  - FC Port driver for Windows Server 2003, Windows 2000 or Windows NT
  - Emulex driver for Solaris
  - Emulex driver for Linux
- HBAnyware has been installed properly.
- The firmware file has been downloaded from the Emulex Web site to the Emulex Repository folder (RMRepository). This folder is in the Program Files folder (Windows systems) or in /usr/sbin/hbanyware (Linux systems).
- The firmware file has been extracted into the Emulex Repository folder. When updating firmware on a remote system, the firmware is automatically transferred to the remote system and placed in the Emulex Repository folder (RMRepository).

## Loading Procedure

1. Start HBAnyware.
2. In the discovery tree (left pane), click the adapter to which you want to load the firmware.
3. In the property tabs (right pane), select the Firmware tab.



4. On the Firmware tab, click the Browse button. The Select Firmware File browse window is displayed.
5. Browse to the Emulex Repository. Select the firmware file to download and click OK. A status bar displays the progress of the download. During this time the host bus adapter (or adapters) in the discovery tree is displayed in red text, indicating that it is offline. It is displayed in black text when the update is complete.

If you are updating the firmware on a dual-channel HBA, repeat steps 2 through 5 to update the firmware on the second port.

## Current Firmware Field Descriptions

Firmware Version - the Emulex firmware version number for this model of HBA.

Operational Firmware Name - if visible, the name of the firmware that is operational.

SLI-1 Firmware Name - the name of the SLI-1 firmware overlay.

SLI-2 Firmware Name - the name of the SLI-2 firmware overlay.

**Note** If the state of the boot code message on the board has changed, this change will be reflected immediately on the Details tab.

## Boot Bios Field Descriptions

Boot Bios Revision - when enabled, displays the revision number of the boot bios file in use. Use the buttons to enable or disable boot bios.

## Firmware Update Field Descriptions

Firmware file - when a firmware file is selected using the Browse button, the selected file appears here. The Download button enables you to download the selected firmware file.

## Update Firmware

### Prerequisites:

- The driver for Linux (including lputil) is installed properly.
- The firmware file has been downloaded to a local drive.

This procedure uses the lputil utility, which is installed with the driver.

**Caution** If you are using lputil to update firmware on an LP10000DC, LP10000, LP1050DC, LP1050 or LP9802DC HBA, you must use lputil version 1.5a0 or later. For any other HBA, you can use lputil version 1.4a4 or later.

Firmware versions differ between adapter versions. Make sure you have downloaded the appropriate firmware for your adapter.

### Load Firmware

**Caution** Do not interrupt this process or power down the system until the process is complete.

1. Start the utility by entering the complete path to lputil. The path in the example reflects the default installation path. If the installation path was modified, adjust the command appropriately.

`/usr/sbin/lpfc/lputil`

2. From the Main menu, enter 3, Firmware Maintenance.
3. If prompted, choose the HBA that is being updated.
4. Enter 1, Load Firmware Image.
5. Enter the full path to the firmware file.
6. Enter 0 twice to exit the utility.

The new firmware is transferred to flash ROM.

If you are updating the firmware on a dual-channel HBA, repeat steps 3 through 5 to update the firmware on the second port.

## FC Boot

Using the lputil utility you can:

- Update BootBios
- Enable BootBios
- Update EFI Boot
- Boot the EFI System

# Update BootBIOS

## Prerequisites:

- The driver for Linux (including lputil, which is used in this procedure) is installed properly.
  - The boot code file has been downloaded to a local drive.
1. Start the utility by entering the complete path to lputil. The path in the example reflects the default installation path. If the installation path was modified, adjust the command appropriately.

- If lputil was installed from an rpm file, enter the following command:

```
/usr/sbin/lpfc/lputil
```

2. From the Main menu, enter 3, Firmware Maintenance.
3. Enter 1, Load Firmware Image.
4. Enter the full path to the boot code file.

The new boot code is transferred to flash ROM.

5. Enter 0 twice to exit.

## Enable BootBIOS Message

### Prerequisites:

- The Emulex driver for Linux (including lputil, which is used in this procedure) is installed properly.
  - The OpenBoot file has been downloaded to a local drive.
1. Start the utility by entering the complete path to lputil. The path in the example reflects the default installation path. If the installation path was modified, adjust the command appropriately.

```
/usr/sbin/lpfc/lputil
```

2. From the Main menu, enter 3, Firmware Maintenance.

The Firmware Maintenance menu is displayed.

3. From the Firmware Maintenance menu, press 6, Boot BIOS Maintenance.
  - If the boot code is currently disabled, press 1, Enable Boot BIOS, to enable the boot code.
  - If the boot code is already enabled, press 1, Disable Boot BIOS, to disable the boot code.
  - If the boot code is not currently loaded, the following message displays:

```
There is no Boot BIOS found on adapter
```

4. Enter 0 twice to exit.

# Load EFIBoot Using the Driver for Linux Utility (lputil)

## Prerequisites:

- One of the following drivers installed properly:
  - Driver for Linux IA-64, Red Hat Enterprise Linux 2.1
  - Driver for Linux IA-64, Red Hat Enterprise Linux 3 and SUSE Linux Enterprise Server 8
- lputil installed properly.
- The EFIBoot file has been downloaded to a local drive.

**Caution** If you are downloading EFIBoot on an HBA attached to the remote system disk, the EFI Utility is recommended to perform the download. The EFI utility is bundled with the EFI boot firmware on the Emulex website.

## Procedure

1. Start the utility by entering the complete path to lputil. The path in the example reflects the default installation path. If the installation path was modified, adjust the command appropriately.
  - If lputil was installed from an rpm file, enter the following command:

```
/usr/sbin/lpfc/lputil
```

2. From the Main menu, enter 3, Firmware Maintenance.
3. Enter 1, Load Firmware Image.
4. Enter the full path to the EFIBoot file.

The new boot code is transferred to flash ROM.

5. Enter 0 twice to exit.
6. Reboot the system.



# Load EFIBoot Using HBAAnyware

## Prerequisites

- One of the following drivers is installed properly:
  - SCSIport Miniport driver for Windows Server 2003
  - Storport Miniport driver for Windows Server 2003
  - FC Port driver for Windows Server 2003
  - Emulex driver for Linux
- HBAAnyware has been installed properly.
- The EFIBoot files have been downloaded from the Emulex Web site to the Emulex Repository folder (RMRepository). This folder is in the Program Files folder.
- The EFIBoot file has been extracted into the Emulex Repository folder.

**Caution** If you are downloading EFIBoot on an HBA attached to the remote system disk, it is recommended to use the EFI Utility to perform the download.

## Loading Procedure

1. Start HBAAnyware.
2. In the discovery tree (left pane), click the adapter to which you want to load the firmware.
3. In the property tabs (right pane), select the Firmware tab.
4. On the Firmware tab, click the Browse button. The Select Firmware File browse window is displayed.
5. Browse to the Emulex Repository. Select the EFIBoot file to download and click OK. A status bar displays the progress of the download. During this time the host bus adapter (or adapters) in the discovery tree is displayed in red text, indicating that it is offline. It is displayed in black text when the update is complete.
6. Reboot the system.

If you are updating EFIBoot on a dual-channel HBA, repeat steps 2 through 5 to update the EFIBoot on the second port.

**Note** If the state of the boot code message on the board has changed, this change will be reflected immediately on the Details tab.

## Boot the EFI System

**Note** If you do not have the most recent firmware, it is suggested that you update the firmware first. Go to the firmware section for downloads and procedures.

### Prerequisites

- The EFIBoot file must be flashed to the host bus adapter to which the boot device is attached.

### Procedure

1. Boot the 64-bit EFI system.
2. Once the EFIBoot driver is loaded in an EFI shell, type the following to verify that the driver is loaded:

Drivers

Information similar to the following will be displayed:

94	00030015	D	X	X	6	-	Emulex SCSI Pass Thru driver	Elxcli
95	00030015	?	-	X	-	-	Emulex Fibre HBA driver	Elxcli
96	00030015	?	-	X	-	-	Emulex Fibre Disk driver	Elxcli

- Emulex SCSI Passthru driver: This driver produces a SCSI pass through handle for each Emulex Adapter.
- Emulex Fibre HBA driver: This driver produces a SCSI/FIBRE device path handle for each device found.
- Emulex Fibre Disk driver: This driver produces a block IO protocol for each SCSI/FIBRE Device path.

## Configuring the Driver

You can configure the driver using HBAnyware or lpfc.conf.

## Set Driver Parameters Using HBAnyware

The Driver Parameters tab allows you to modify driver parameters either for an individual adapter or for all adapters, with the same single driver type and version, that are in one host.

For example, if you set driver parameters on a host that includes two adapters with the SCSIport Miniport driver installed, you can make changes to the driver parameters for both adapters simultaneously.


For each parameter, the tab displays the current value, the range of acceptable values, the default value, and whether the parameter is dynamic (a dynamic parameter allows the change to take effect without restarting the HBA or rebooting the system).

This page contains instructions for the following:

- View Driver Parameters for an Adapter
- View Driver Parameters for a Host
- Change a Parameter's Value
- Restore Parameters to Their Earlier Values
- Reset All Default Values

### View Driver Parameters for an Adapter


To display the driver parameters for an adapter, do the following:

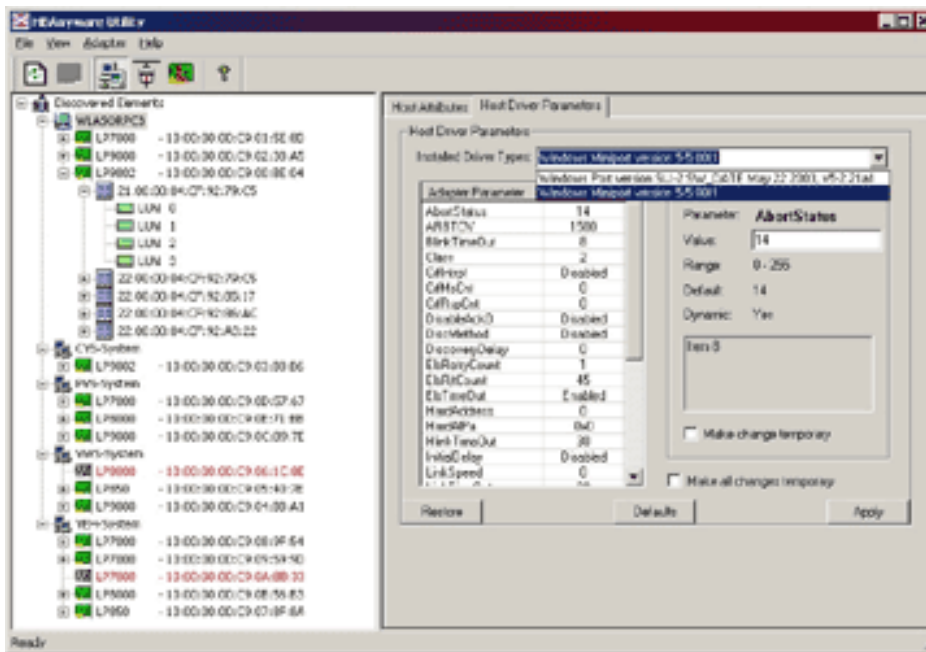
1. Start HBAnyware.
2. Do one of the following:
  - From the menu bar, click View, then click Group HBAs by Host Name.
  - From the toolbar, click the  button.
3. In the discovery tree, click the adapter for which you want to change a parameter. The General tab is displayed.
4. Click the Driver Parameters tab. The Installed Driver Types field displays the driver operating system version that is installed on the adapter.

**Note** The illustration above is an example. The driver parameters you see may be different, depending on the installed driver.

## View Driver Parameters for a Host

To display the driver parameters for a host, do the following:

1. Start HBAAnyware.
2. Do one of the following:
  - From the menu bar, click View, then click Group HBAs by Host Name.
  - From the toolbar, click the  button.
3. In the discovery tree, click the host for which you want to change a parameter. The Host Attributes tab is displayed.
4. Click the Host Driver Parameters tab. The Installed Driver Types drop-down box displays a list of all driver types and driver versions that are installed on the adapters in the host. Click the driver for which you want to make changes.



**Note** The illustration above is an example. The driver parameters you see may be different, depending on the installed driver.

## Change a Parameter's Value

After you follow the appropriate procedure to display the host or adapter parameter tab, do the following to change a parameter's value:

1. In the driver parameters tab, click the parameter that you want to change. Information about the parameter appears on the right side of the screen.
2. Enter a new value in the Value field. You must enter values in decimal or hexadecimal format, depending on how the current value is presented. If the value is in hexadecimal format, it is prefaced by "0x", for example 0x2d, and if you change the value you must enter it in hexadecimal format.
3. If you want the change to be temporary (causing the parameter to revert to its last permanent setting when the system is rebooted), check the "Make change temporary" box. This option is available only for dynamic parameters.
4. If you are making changes to multiple parameters, and you want all the changes to be temporary, check the "Make all changes temporary" box. This setting overrides the setting of the "Make change temporary" box. Only dynamic parameters can be made temporary.

5. To apply your changes, click Apply.
6. For parameters which cannot be changed dynamically (link speed for example), the driver must be unloaded, recompiled and then reloaded.

## **Restore All Parameters to Their Earlier Values**

If you have made changes to parameters and have not saved them by clicking Apply, and you want to restore the parameters to their last saved values, click Restore.

## **Reset All Default Values**

If you want to reset all parameter values to their default (out-of-box) values, click Defaults.



## Configuration Methods using lpfc.conf

There are four ways to configure the driver:

- Permanently (global)
- Permanently (per adapter)
- Temporary (global)
- Temporary (per adapter)

### Permanent Configuration Methods

Permanent configuration requires that the new values be saved and the driver rebuilt. These changes are considered permanent because they stay in effect until a driver parameter is changed, saved and rebuilt again.

All parameters are contained in /etc/lpfc.conf which is symbolically linked to lpfc.conf in the driver installation directory.

**To make changes that impact all host bus adapters in the system (global changes),** edit the lpfc.conf file. Parameter values are hexadecimal and decimal.

1. Go to the driver source directory.
2. Edit lpfc.conf to change the desired parameter.
3. Save the changes.
4. Rebuild the driver.
5. Rebuild the initial ramdisk image to boot the system with the reconfigured driver (if applicable). Refer to the "Create a New Initial Ramdisk Image" topic in this manual for more information.

## Example of Permanent Global Configuration

You want to set `lpfc_lun_queue_depth` to 20 (default is 30) for all Emulex host bus adapters in your system.

1. Locate the following parameter:

```
lpfc_lun_queue_depth = 30;
```

2. Edit the parameter to display the following:

```
lpfc_lun_queue_depth = 20;
```

3. Save the change.
4. Rebuild the driver.
5. Rebuild the initial ramdisk image to boot the system with the reconfigured driver (if applicable). Refer to the "Create a New Initial Ramdisk Image" topic in this manual for more information.

**To make changes for specific adapters**, edit the `lpfc.conf` file. Parameter values are hexadecimal and decimal.

1. Go to the driver source directory.
2. Edit `lpfc.conf` (change the desired parameter for a specific adapter or adapters).
3. Save your changes.
4. Rebuild the driver.
5. Rebuild the initial ramdisk image to boot the system with the reconfigured driver (if applicable). Refer to the "Create a New Initial Ramdisk Image" topic in this manual for more information.

## Example of Permanent Per Adapter Configuration

You want to set `lpfc_lun_queue_depth` to 20 (default is 30) for host bus adapter #1.

1. Locate the following parameter:

```
lpfc1_lun_queue_depth = -1;
```

2. Edit the parameter to display the following:

```
lpfc1_lun_queue_depth = 20;
```

3. Save the change.
4. Rebuild the driver.
5. Rebuild the initial ramdisk image to boot the system with the reconfigured driver (if applicable). Refer to the "Create a New Initial Ramdisk Image" topic in this manual for more information.

## Temporary Configuration Method

When you manually load the driver as a module using the `insmod` command and change one or more driver parameter values, it is a temporary configuration. These changes are considered temporary because they are valid for the current session only or until the driver is manually loaded again. Using the `insmod` command requires no editing or saving. This temporary configuration method overrides the `lpfc.conf` file for the current session.

Values are hexadecimal and decimal. You can set up temporary configurations to be on a global or per adapter basis.

### Example of Temporary Global Configuration

You want to temporarily set `lpfc_lun_queue_depth` to 20 (default is 30) for all host bus adapters in your system. Load the driver with the following command:

```
insmod lpfc lpfc_lun_queue_depth = 20;
```

## Example of Temporary Per Adapter Configuration

You want to temporarily set `lun_queue_depth` to 20 (default is 30) for host bus adapter #1. Load the driver with the following command:

```
insmod lpfc lpfc1_lun_queue_depth = 20;
```

**Note** Refer to the `lpfc.conf` file for the correct parameter name and values for the parameter you want to change.

## Creating a New Ramdisk Image

The lpfc-install script creates a ramdisk containing the lpfc driver for the currently running kernel on systems running Red Hat Enterprise Linux or SuSE Linux Enterprise Server.

**Note** You must perform this step whenever the driver is rebuilt. For example, if you change parameters within the lpfc.conf file and rebuild the driver.

To create a new initial ramdisk image:

1. Execute the lpfc-install script using the '--createramdisk' option. Type:

```
lpfc-install --createramdisk
```

## Set Up LUN Support

By default, the Linux kernel does not support multiple LUNs. To support multiple LUNs, edit `/etc/lilo.conf` or for Linux on Power platforms `/etc/yaboot.conf`, and append the following line to the end of the file:

```
append="max_scsi_luns=X"
```

where: **X** is the number of LUNs per SCSI device, between 1 and 256.

Before you build a new kernel, run the 'make menuconfig' command and build a menu to configure the kernel and drivers. This configuration menu contains SCSI options. Ensure that the SCSI option, 'Probe all LUNs' is enabled.

**Note** You must reboot the system for these changes to take effect.

## Dynamically Add LUNs and Targets

The Emulex driver for Linux enables you to dynamically add LUNs and targets without unloading or reloading the lpfc module and without resetting the adapter.

You can dynamically add LUNs and targets with the lpfc\_lun\_skip parameter enabled or disabled. The lpfc\_lun\_skip parameter is contained in the lpfc.conf file and is disabled by default. For more information about the lpfc\_lun\_skip parameter, or to change its setting, refer to "The Configuration File (lpfc.conf)" topic in this manual.

To dynamically add LUNS and targets with lun\_skip disabled (default):

1. Log on as 'root'.
2. Type:

```
# echo "scsi add-single-device <H> 0 <T> <L>" >/proc/scsi/scsi
```

Where:

- **<H>** represents the host ID of the host bus adapter
- **<T>** represents the SCSI ID of the storage array
- **<L>** represents the LUN number of the newly added LUN

**Note** The host number is the SCSI # as seen in /proc/scsi/scsi. The host # and lpfc # in the previous step may not be identical. This is because lpfc0 may not be the first SCSI host in the system.

To dynamically add LUNS and targets with lun\_skip enabled:

1. Log on as 'root'.
2. Type:

```
# echo "scsi remove-single-device <H> 0 <T> <L>" >/proc/scsi/scsi
```

### 3. Type:

```
# echo "scsi add-single-device <H> 0 <T> <L>" >/proc/scsi/scsi
```

Where:

- **<H>** represents the host ID of the host bus adapter
- **<T>** represents the SCSI ID of the storage array
- **<L>** represents the LUN number of the newly added LUN

**Note** The host number is the SCSI # as seen in /proc/scsi/scsi. The host # and lpfc # in the previous step may not be identical. This is because lpfc0 may not be the first SCSI host in the system.



## Understand Device Numbering

There are two levels of device numbering. The first level of device numbering is the driver instance number. This is the number that is displayed in log messages to syslog or the console, such as `lpfcX`. Typically the driver instance number is equal to the adapter number.

The second level of numbering is the SCSI device number. This number is assigned by the system for each SCSI target it detects. It is typically in the special files created to access each SCSI device, for example, `/dev/sda` through `/dev/sdz` and `/dev/sdaa` through `/dev/sdax` etc. Linux supports a total of 128 SCSI devices per system. Thus, a host could support disk devices from `/dev/sda` through `/dev/sddx`.

Once these numbers are assigned, they will stay the same between reboots unless there has been hardware changes to the system or Fibre Channel network, or some devices are offline or not ready.

## Download PCI Configuration

**Note** Select this option **only** if you are familiar with PCI configuration registers.

To download the PCI configuration data, follow these steps.

1. Start the lputil utility.
2. From the lputil Main menu, select 3, Firmware Maintenance.

The Firmware Maintenance menu is displayed.

3. Select 5, Load PCI Configuration File. PCI configuration data is contained in .cfl files, which can be used across any supported platform.
4. Enter the region in flash ROM to download the data, and press <Enter>.

You can download one of three data sets for the PCI configuration registers.

- Default PCI configuration region
  - PCI configuration region 1
  - PCI configuration region 2
5. Upon completion, press 0 to return to Main menu.
  6. Press 0 to exit the utility.
  7. Power down the system.
  8. Restart the system to load new configuration data.

## The Configuration File (lpfc.conf)

The lpfc.conf file contains all the variables that control driver initialization.

**Note** Utilities such as HBAnyware expect to find lpfc.conf installed in /etc directory. If documented install procedures are followed, a link to lpfc.conf file is automatically created in the /etc directory.

In the lpfc.conf file, all adapter-specific parameters have lpfcX\_ prefix (where X is the driver instance number); e.g., setting lpfc0\_num\_iocbs = 2000 allocates 2000 I/O control blocks for the driver interface lpfc0. A value of -1 for an adapter specific parameter will assign the default value for that parameter as denoted by lpfc\_param.

Changes to the /etc/lpfc.conf file require a driver rebuild, a new ramdisk image and driver reload for the changes to take effect.

**Note** If you want to override a driver parameter for a single driver-loading session, you can specify it as a parameter to the insmod command. For example:

```
# insmod ./lpfc.o lpfc_automap=0
```

This will load Emulex's SCSI support driver with lpfc\_automap set to 0 for this session.

If you load the driver with the help of /etc/modules.conf, you can also specify changes to driver parameters in /etc/modules.conf. For example:

```
options lpfc lpfc_automap=0 lpfc_bind_entries=1 \
lpfc_fcp_bind_WWPN=50060482c33ed60f:
lpfc1t1
```

would bind device with WWPN 50060482c33ed60f to target 1, with no other device mapped.

Click on a parameter to view a detailed description.

Variable	Default	Min	Max	Comments
lpfc_ack0	0	0	1	Use ACK0 for class 2.
lpfc_automap	1	0	1	Automatically assign SCSI IDs to FCP targets detected.
lpfc_check_cond_err	0	Boolean 0=false, 1=true		Treat certain FCP check conditions as FCP RSP errors.
lpfc_cr_count	1	1	255	This parameter determines the values for I/O coalescing for cr_delay (msec) or cr_count outstanding commands.
lpfc_cr_delay	0	0	63	This parameter determines the values for I/O coalescing for cr_delay (msec) or cr_count outstanding commands.
lpfc_delay_rsp_err	0	Boolean 0=false, 1=true		Treat FCP RSP errors like no-device-delay.
lpfc_discovery_threads	1	1	64	Specifies the maximum number of ELS commands that can be outstanding for a discovery.

lpfc_dqfull_throttle_up_inc	1	0	128	Amount to increment LUN queue depth each time.
lpfc_dqfull_throttle_up_time	1	0	30	Time interval, in seconds, to increment LUN queue depth.
lpfc_extra_io_tmo	0	0	255	Extra FCP cmd timeout when connected to a fabric (in seconds).
lpfc_fcp_bind_DID	inactive	N/A	N/A	Bind specific SCSI IDs to targets based on Fibre Channel Port ID.
lpfc_fcp_bind_method	2	1	4	Specifies the bind method (WWWN/WWPN/DID/ALPA map) to be used.
lpfc_fcp_bind_WWNN	inactive	N/A	N/A	Bind specific SCSI IDs to targets based on Fibre Channel WWNN.
lpfc_fcp_bind_WWPN	inactive	N/A	N/A	Bind specific SCSI IDs to targets based on Fibre Channel WWPN.
lpfc_fcp_class	3	2	3	Fibre Channel class for FCP data transmission.

lpfc_fdmi_on	0	0	2	False (0) if disabled. (1) or (2) if enabled depending on type of support needed.
lpfc_inq_pqb_filter	1	Boolean 0=false, 1=true		If true, the driver changes the peripheral quantifier bit from 1 to 3 for inquiry responses.
lpfc_linkdown_tmo	30	0	255	(seconds) How long the driver waits before deciding that the Fibre Channel link is down.
lpfc_link_speed	0	0=auto select 1=1G 2=2G 4=10G 8=4G		Sets link speed.
lpfc_log_verbose	0x0	0x0	0xffff	(bit mask) Extra activity logging.
lpfc_lun_queue_depth	30	1	128	Default max commands sent to a single logical unit (disk).
lpfc_max_lun	256	1	256	Specifies the maximum number of LUNs per target. A value of 20 means LUNs from 0 to 19 are valid.

lpfc_max_target	256	1	256	Linux scans all targets. This configuration parameter limits how many targets / LUNs the driver will support. Don't exceed 256, otherwise device scan will wrap around.
lpfc_lun_skip	0	Boolean 0=false, 1=true		Fake out the Linux SCSI layer to detect all LUNs if there are LUN holes on a device.
lpfc_nodev_holdio	0	Boolean 0=false, 1=true		Hold I/O err if device disappears.
lpfc_no_device_delay	1	0	30	Delay to fail back an I/O in seconds.
lpfc_nodev_tmo	30	0	255	Seconds to hold I/O err if device disappears.
lpfc_scan_down	1	0	1	Select method for scanning ALPA to assign a SCSI ID.
lpfc_scsi_req_tmo	30	0	255	Time out value (in seconds) for SCSI request sent.
lpfc_tgt_queue_depth	0	0	10240	Default max commands sent to a single target.

lpfc_topology	0	0x0=loop then P2P 0x2=P2P only 0x4=loop only 0x6=P2P then loop		Fibre Channel link topology (defaults to loop, if it fails attempts point- to-point mode).
lpfc_use_adisc	0	Boolean 0=false, 1=true		Send ADISC instead of PLOGI for device discovery or RSCN.
lpfc_xmt_que_size	256	128	10,240	Number of oustanding IP commands for an adapter.



## Using the 'devlabel' Tool

The devlabel tool provided by Red Hat for Red Hat Enterprise Linux 3 manages persistent names for Fibre Channel and other disk devices.

Using the devlabel utility, you can add persistent names, remove persistent names, or show persistent names.

Visit the Red Hat web site for more information.

To add a persistent name:

Type:

```
# devlabel add -d <device> -s <symlink>
```

For example:

```
# devlabel add -d /dev/sdb1 -s /dev/mydata
```

This example creates the persistent name /dev/mydata, which points to /dev/sdb1.

To remove a persistent name:

Type:

```
# devlabel remove -s <symlink>
```

For example:

```
# devlabel remove -s /dev/mydata
```

This example removes the persistent name /dev/mydata.

To show persistent names:

Type:

```
# devlabel status
```


This command displays all persistent names in the system.

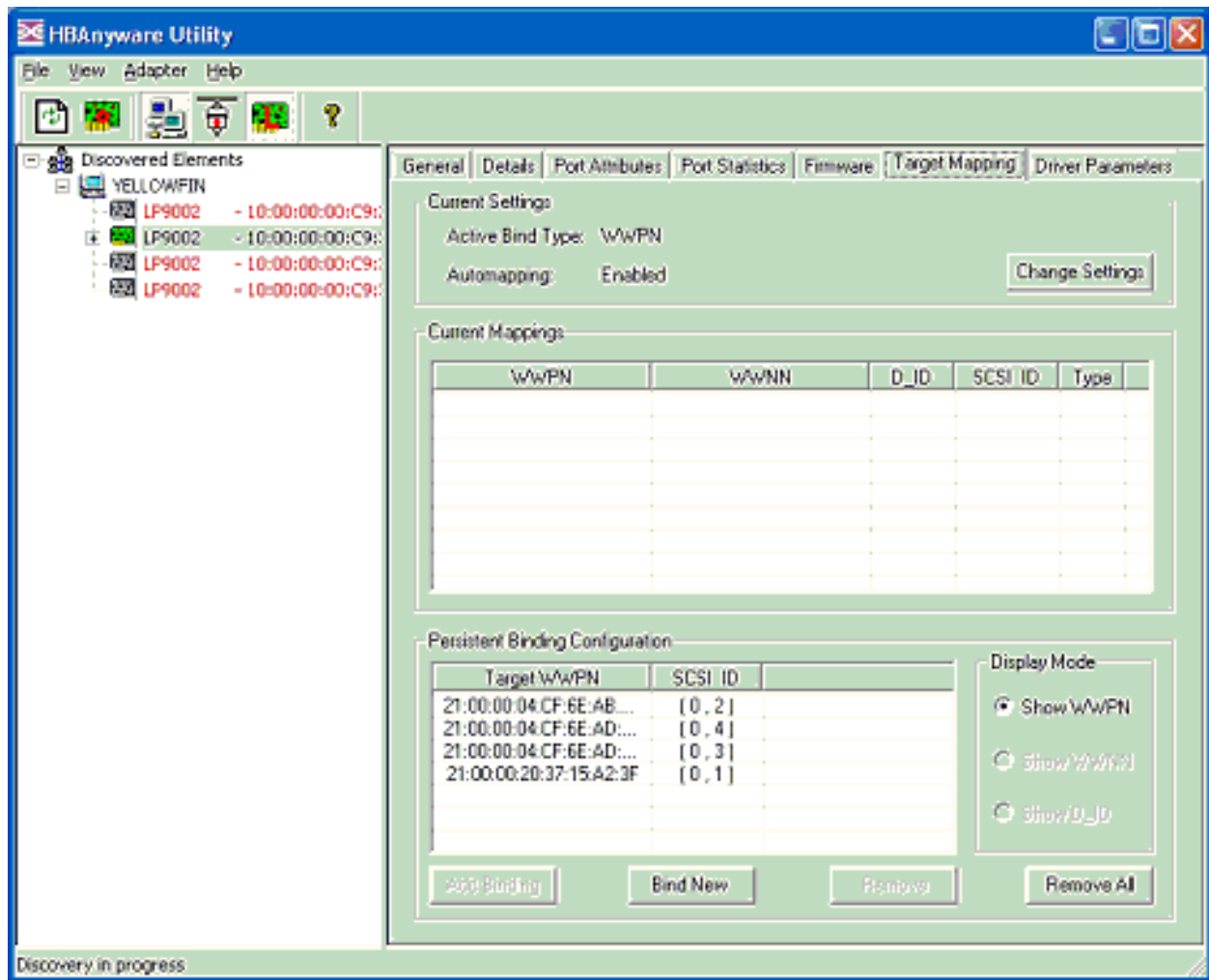
## View Target Mapping and Set Up Persistent Binding

The Target Mapping tab in HBAnyware enables you to view current target mapping and to set up persistent binding.

### View Target Mapping

To view the Target Mapping tab, do the following:

1. Start HBAnyware.
2. Do one of the following:
  - From the menu bar, click View, then click Group HBAs by Host Name.
  - From the toolbar, click the  button.
3. Click a target in the discovery tree.
4. Click on the Target Mapping tab.



## Set Up Persistent Binding

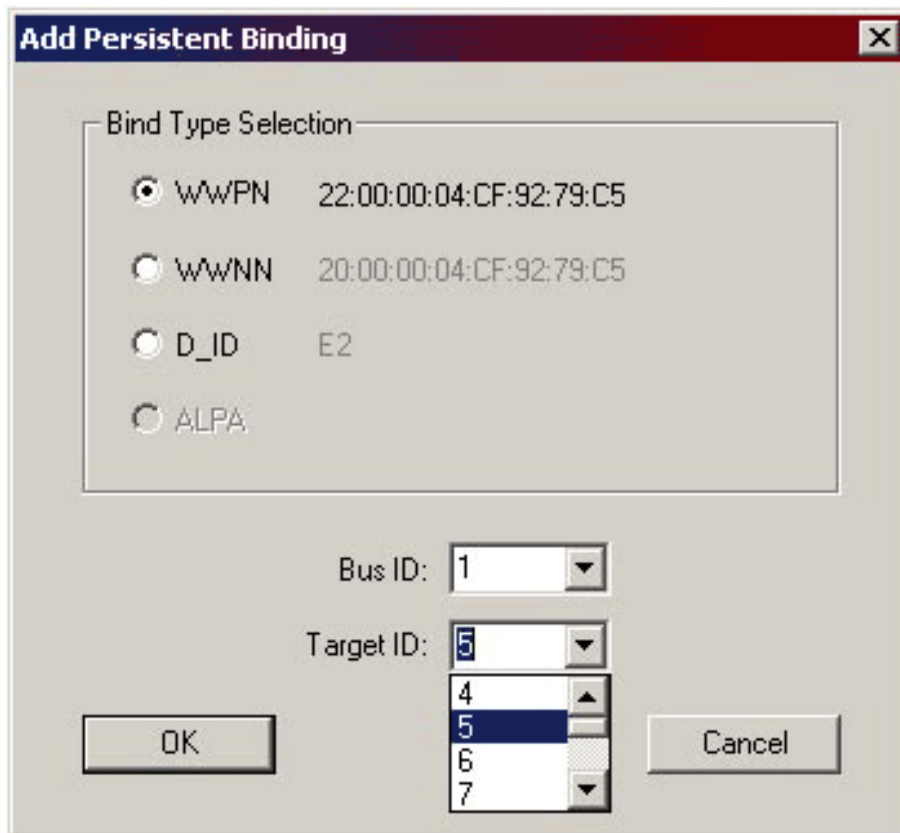
To set up persistent binding, do the following:

1. Start HBAAnyware.
2. In the directory tree, click the host bus adapter (HBA) for which you want to set up persistent binding.
3. Click the Target Mapping tab. All targets are displayed.
4. Target mappings are displayed by world wide port name (WWPN), world wide node name (WNN), device ID (D\_ID), SCSI ID, or Type. This can be either 'PB', indicating that the mapping was the result of a persistent binding, or 'Auto', indicating that the target was automapped. In the Display Mode section, choose the display mode you want to use.

5. If you want to change the Active Bind Type (the mode used to persistently bind target mappings) or Automapping setting, click Change Settings. Select the Active Bind Type (WWPN, WWNN or D\_ID), and set Automapping to Enabled or Disabled.

To add a persistent binding, do the following:

1. In the Targets Table, click the target that you want to bind.
2. Click Add. The Add Persistent Binding dialog box is displayed.



The image shows a Windows-style dialog box titled "Add Persistent Binding". It contains a "Bind Type Selection" section with four radio buttons: "WWPN" (selected), "WWNN", "D\_ID", and "ALPA". Each radio button is followed by a text field showing a hexadecimal address: "22:00:00:04:CF:92:79:C5" for WWPN, "20:00:00:04:CF:92:79:C5" for WWNN, "E2" for D\_ID, and an empty field for ALPA. Below this section are two dropdown menus: "Bus ID:" with "1" selected, and "Target ID:" with "5" selected. The "Target ID:" dropdown is open, showing a list of numbers from 4 to 7, with "5" highlighted. At the bottom are "OK" and "Cancel" buttons.

3. Select the Bind Type that you want to use (WWPN, WWNN or D\_ID).
4. Select the Bus ID and Target ID that you want to bind, and click OK.

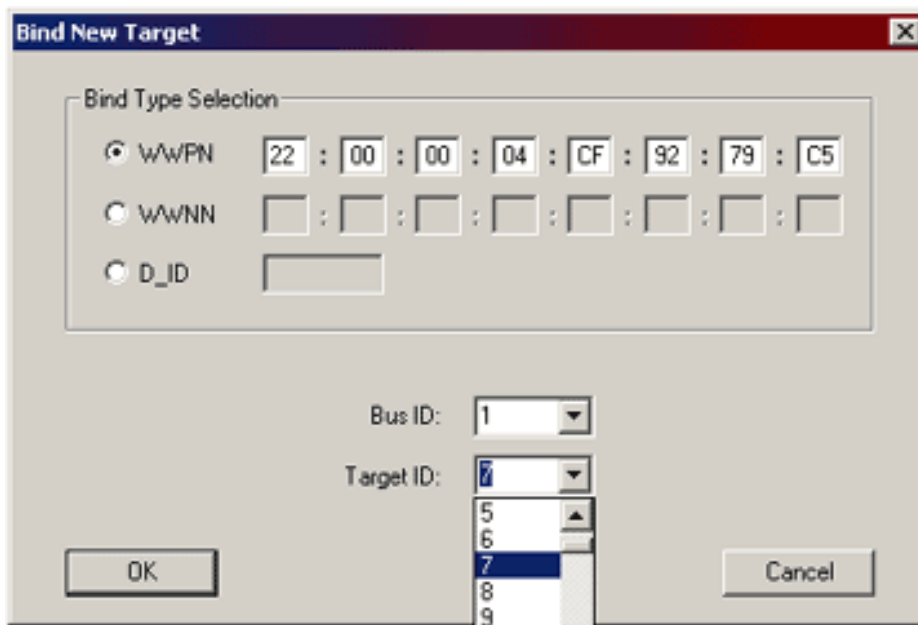
**Note** Automapped targets will have entries only in the second column of the Targets Table. Persistently bound targets will have entries in the second and third columns. In this case, the third column contains the SCSI bus and target numbers you specified in the Add Persistent Binding dialog box. This binding will take effect only after the local machine is rebooted.

It is possible to specify a SCSI bus and target that have already been used on behalf of a different FC target. HBAnyware does not detect this until you click the OK button in the Add dialog box. Then a "duplicate binding" error message is displayed, and the request is rejected.

Generally, you should ensure that the bind type in the Current Settings dialog box is the same as the type of binding selected in the Persistent Binding Configuration dialog box.

To bind a target that does not appear in the Persistent Binding Table, do the following:

1. Click Bind New. The Bind New Target dialog box is displayed.



2. Click the type of binding you want to use, and type the WWPN, WWNN or D\_ID you want to bind to the target.
3. Select the Bus ID and Target ID that you want to bind, and click OK.

**Note** A target will not appear on the target list if automapping has been disabled and the target is not already persistently bound.

## HBAnyware Security Overview

After HBAnyware, which includes the HBAnyware utility and remote server, is installed on a group of systems, HBAnyware can remotely access and manage the HBAs on any systems in the group. This may not be a desirable situation, because any system can perform actions such as resetting boards or downloading firmware.

The HBAnyware security package can be used to control which HBAnyware systems can remotely access and manage HBAs on other systems in a Fibre Channel network. HBAnyware security is systems-based, not user-based. Anyone with access to a system that has been granted HBAnyware client access to remote HBAs can manage those HBAs. Any unsecured system is still remotely accessible by the HBAnyware client software (HBAnyware utility).

The HBAnyware security software is designed to provide two main security features:

1. Prevent remote HBA management from systems in the enterprise that the administrator does not want to have this capability.
2. Prevent an accidental operation (such as firmware download) on a remote HBA. In this case, the administrator does not want to have access to HBAs in systems he or she is not responsible for maintaining.

The first time the HBAnyware Security Configurator is run on a system in an environment where no security has been configured, the initial Access Control Group (ACG) is created. At this point, only this system has remote access to the HBAs in the systems in the ACG. They are no longer remotely accessible from any other system.

Subsequently, additional Access Sub-Groups (ASGs) can be created. This grants systems in the ACG the ability to remotely access the HBAs of other selected systems in the ACG.



# Start the HBAnyware Security Configurator

## Prerequisites

Before you can start the HBAnyware Security Configurator, you must have the following items installed on your system. See the online Installation manual for more information.

- The Solaris or Linux driver
- The HBAnyware and lputil utilities
- The HBAnyware Security Configurator

**Note** Before you start the Configurator, you **must** make sure that all of the systems that are part of, or will be part of, the security configuration are online on the Fibre Channel network so that they receive updates or changes made to the security configuration. Any system that is already part of the security installation might not run with the proper security attributes, if updates to the security configuration are made while it is offline. Any system that is part of the security installation and that is offline when the HBAnyware Security Configurator starts will not be available for security configuration changes even if it is brought online while the Configurator is running.

## Starting the HBAnyware Security Configurator

To start the HBAnyware Security Configurator:

1. Run the `/usr/sbin/hbanyware/ssc` script. Type:

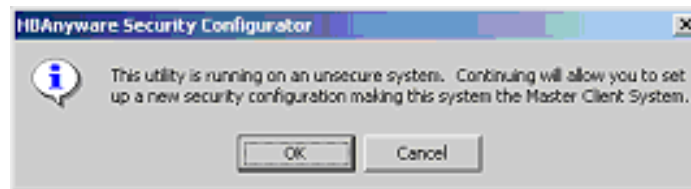
```
/usr/sbin/hbanyware/ssc
```

## Run the Configurator for the First Time/ Create the ACG

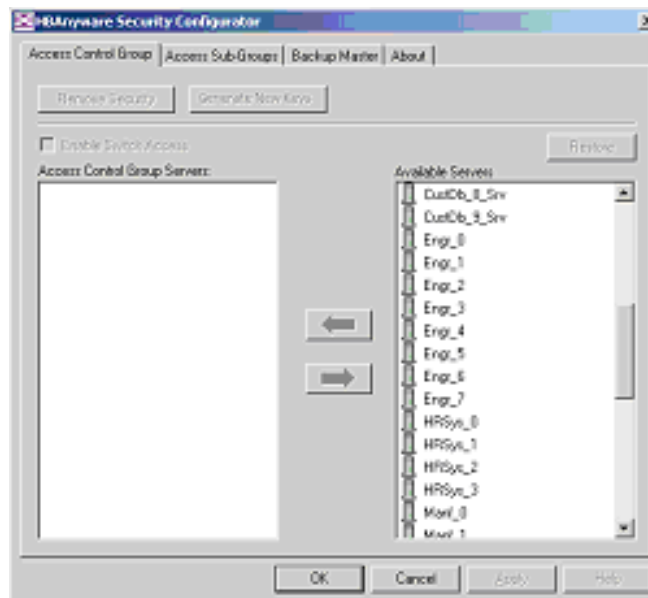
When the HBAnyware Security software is installed on a system and the HBAnyware Security Configurator is run for the first time, that system becomes the Master Security Client (MSC). All of the available servers are discovered and available to become part of the system Access Control Group (ACG). You select the systems to be added to the ACG, and the security configuration is updated on all of the selected servers as well as on the initial system. This selection constitutes the participating platforms in this security installation.

To create the ACG, do the following:

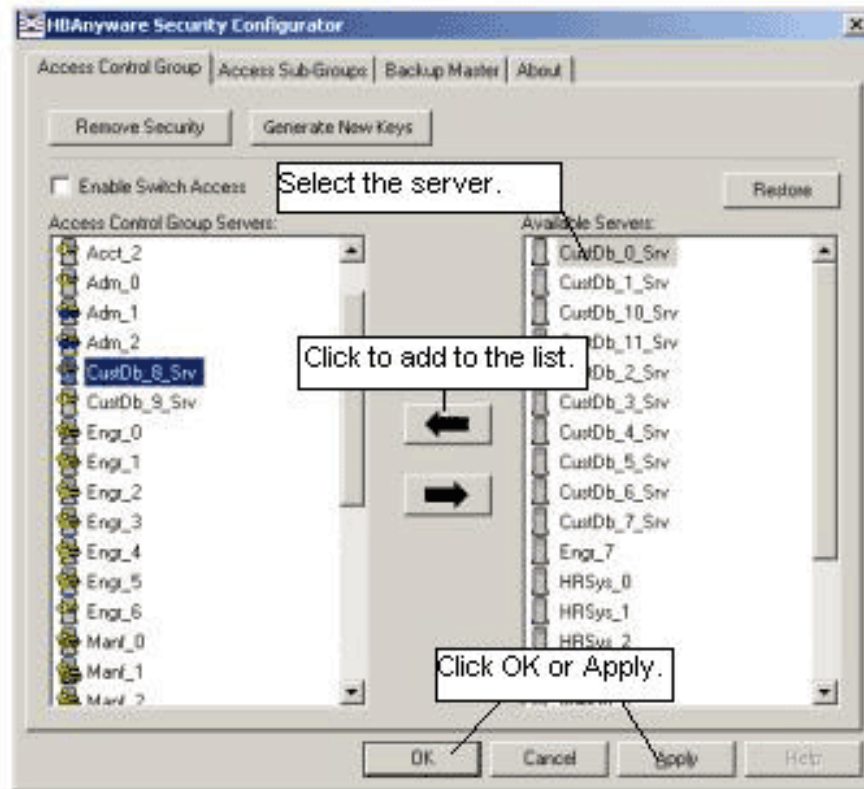
1. Start the HBAnyware Security Configurator for the first time in an unsecure environment. The computer from which you run the Configurator will become the MSC. The following message is displayed:



2. Click OK. The Access Control Group tab is displayed.



3. Select the unsecured servers that you want to add to the ACG from the Available Servers list.



4. Click the left arrow to add the servers to the Access Control Group Servers list.
5. Click OK or Apply.

## Designate an MSC

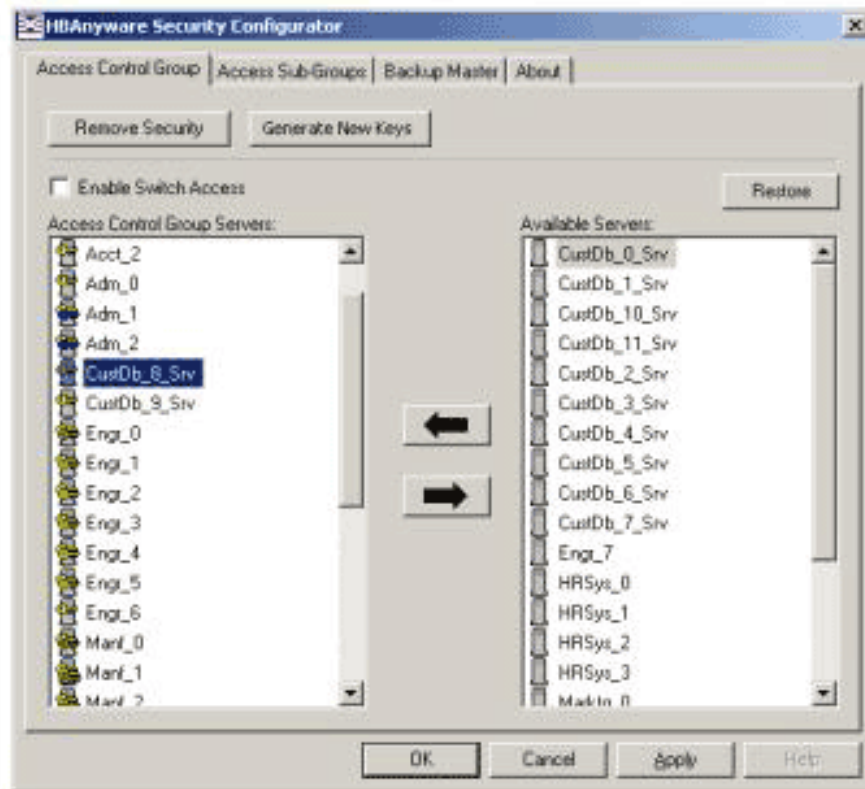
The first time you run the HBAnyware Security Configurator on any system in a Fibre Channel network, that system becomes the MSC. See [Running the Configurator for the First Time](#) for more information.

## Access Control Groups - Introduction

The Access Control Group tab shows the systems that are part of a client's Access Control Group (ACG) and, from the Master Security Client (MSC), allows you to select the systems that belong to the ACG.

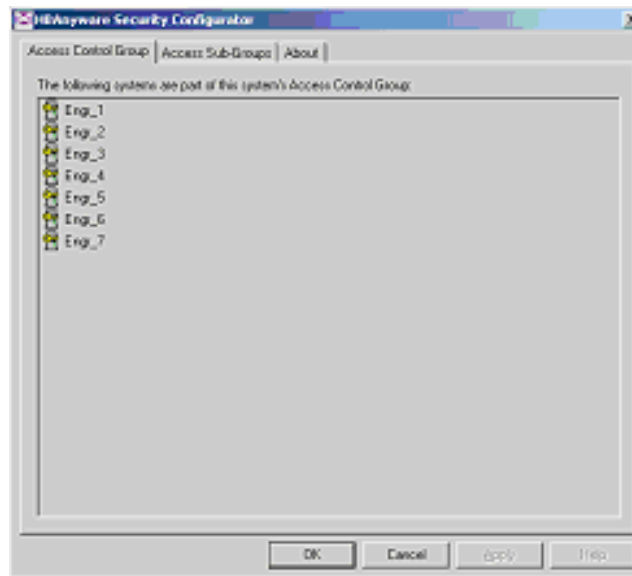
### Access Control Group Tab on the MSC

On the MSC, you select or deselect the systems that are to be part of the security installation in the Access Control Group tab. When you select unsecure systems and move them to the Access Control Group Servers list, these systems are updated to secure them and bring them into the MSC's ACG. When you select systems in the ACG and move them to the Available Servers list, the security configuration for those systems is updated to make them unsecure. After you have configured security from the MSC for the first time, the Access Control Group tab looks similar to the following:



### Access Control Group Tab on a Non-MSC

On a non-MSC system, the Access Control Group tab shows the systems that are part of the client's ACG. You cannot modify the ACG on a non-MSC. (You can modify the ACG only on the MSC or a client higher in the security topology's hierarchy.) The ACG tab on a non-MSC system looks similar to the following:



## ACG Icons

Depending on the configured security topology, a system can be a server in one or more ACGs. It can also be a client to an ACG. The following icons indicate the state of each of the systems in the Access Control Group Servers list.



The system is a secure server in the ACG. It does not belong to an Access Sub-Group (ASG). You can remove this system from the ACG.



The system is a secure server in the ACG and belongs to one or more ASGs. You can remove this system from the ACG.



The system is a secure server in the ACG and a client to an ASG. You cannot remove this system from the ACG until you remove it as a client from the ASG.



The system is a secure server in the ACG, a secure server in one or more ASGs and a client to an ASG. You cannot remove this system from the ACG until you remove it as a client from the ASGs.



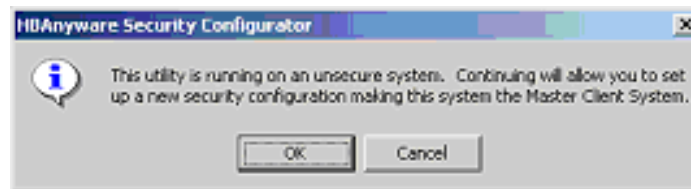
The system is a Backup Master. You cannot remove this system from the ACG until you remove it as a Backup Master.

## Run the Configurator for the First Time/ Create the ACG

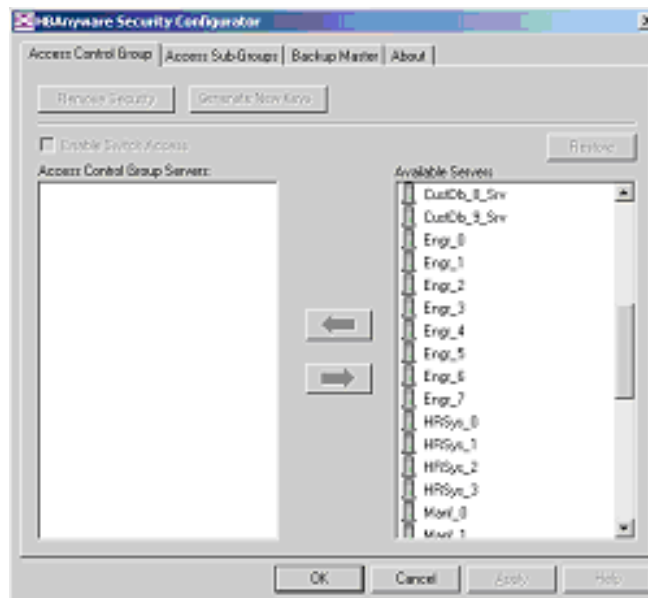
When the HBAnyware Security software is installed on a system and the HBAnyware Security Configurator is run for the first time, that system becomes the Master Security Client (MSC). All of the available servers are discovered and available to become part of the system Access Control Group (ACG). You select the systems to be added to the ACG, and the security configuration is updated on all of the selected servers as well as on the initial system. This selection constitutes the participating platforms in this security installation.

To create the ACG, do the following:

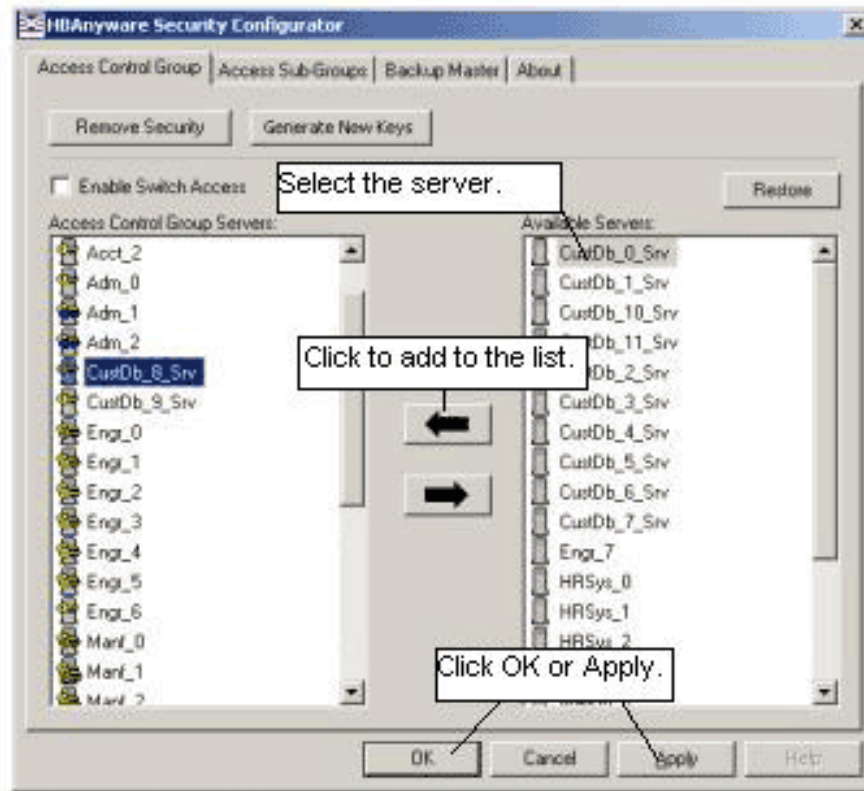
1. Start the HBAnyware Security Configurator for the first time in an unsecure environment. The computer from which you run the Configurator will become the MSC. The following message is displayed:



2. Click OK. The Access Control Group tab is displayed.



3. Select the unsecured servers that you want to add to the ACG from the Available Servers list.



4. Click the left arrow to add the servers to the Access Control Group Servers list.
5. Click OK or Apply.

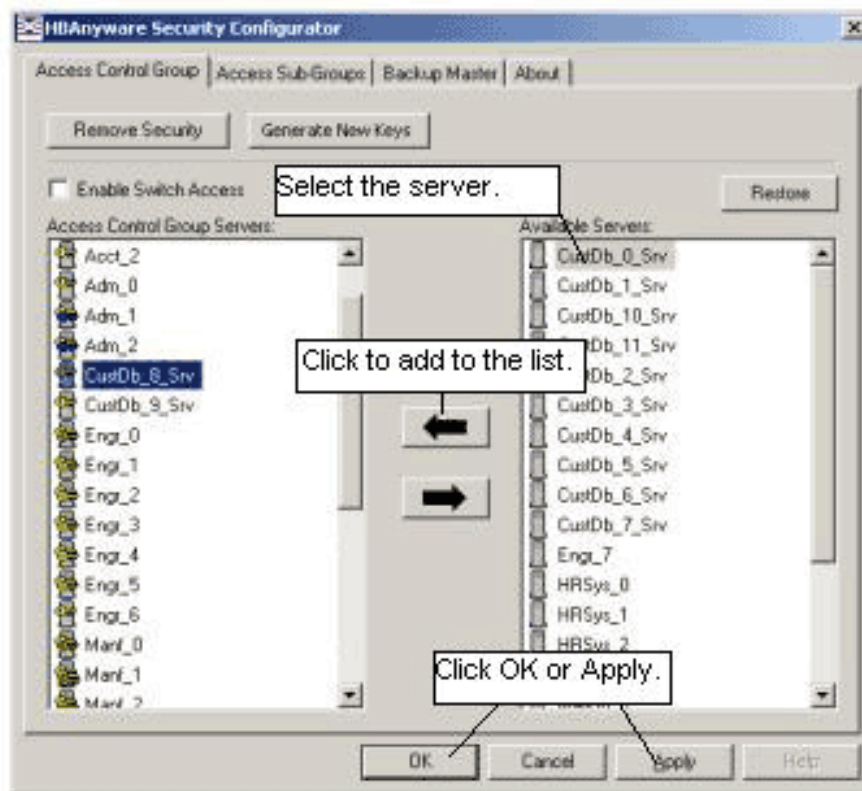


## Add a Server to the ACG

After you create the initial Access Control Group (ACG) on the Master Security Client (MSC), you may want to add unsecured servers to the ACG.

To add servers to the ACG, do the following:

1. Start the HBAware Security Configurator.
2. On the Access Control Group tab, from the Available Servers list, select the unsecured servers that you want to add to the ACG.

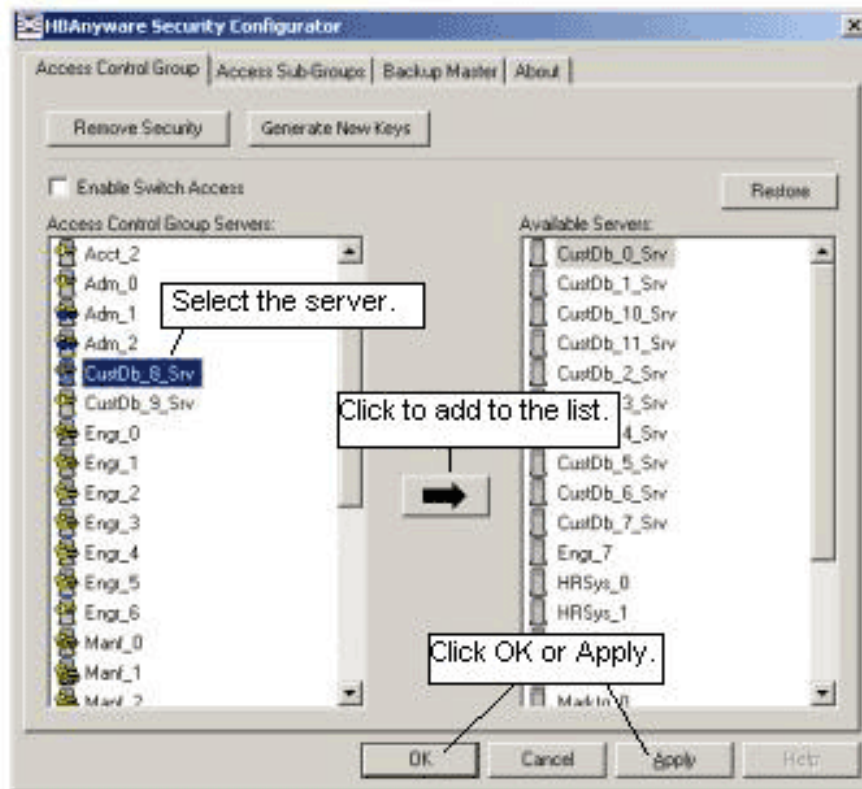


3. Click the left arrow to add the server to the Access Control Group Servers list.
4. Click OK or Apply.

## Delete a Server from the ACG

To delete a server from the Access Control Group (ACG), do the following:

1. Start the HBAAnyware Security Configurator.
2. On the Access Control Group tab, from the Access Control Group Servers list, select the secured systems that you want to delete from the ACG.



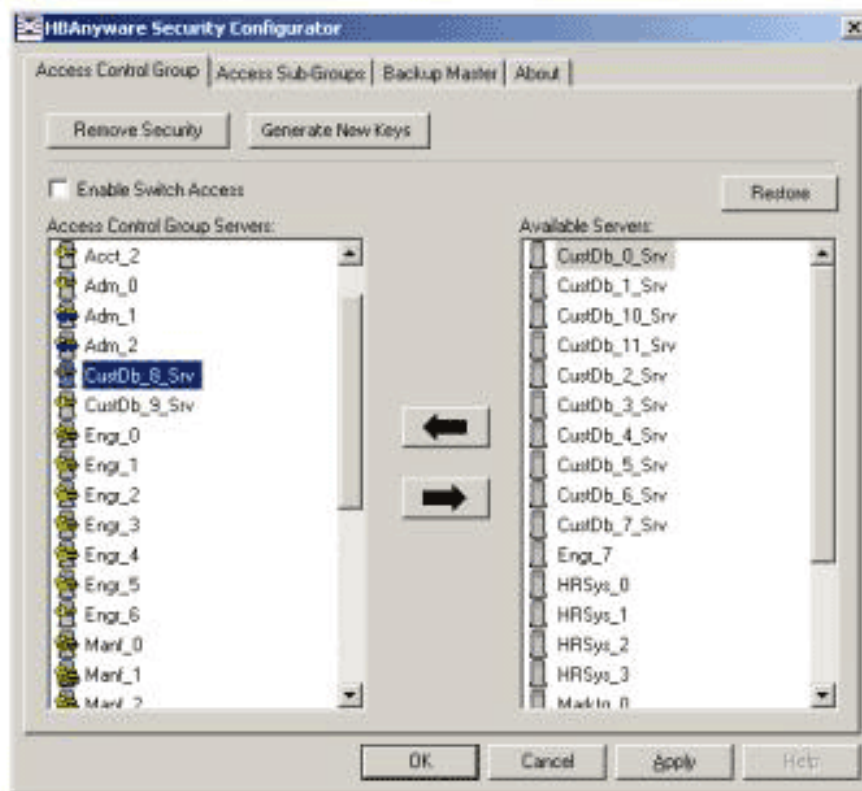
3. Click the right arrow to remove the servers from the Access Control Group Servers list.
4. Click OK or Apply.

## Remove Security from all Servers in the ACG

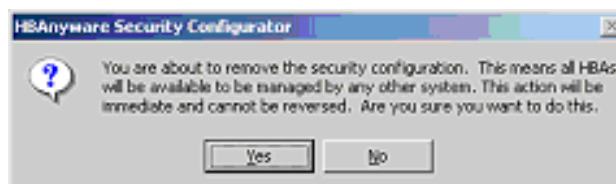
You can remove security from all systems only from the Master Security Client (MSC). Removing the entire security topology on all of the servers in the MSC's ACG puts the servers in an unsecure state. The MSC is also put in an unsecure state; consequently, it is no longer the MSC. Any participating systems that are not online will not receive the 'remove security' configuration update, and as a result will no longer be accessible remotely.

To remove security from all servers in the AGC, do the following:

1. Start the HBAnyware Security Configurator. The Access Control Group tab is displayed.



2. On the Access Control Group tab, click the Remove Security button. The following message is displayed:



3. Click Yes. Security is removed from all servers in the ACG.

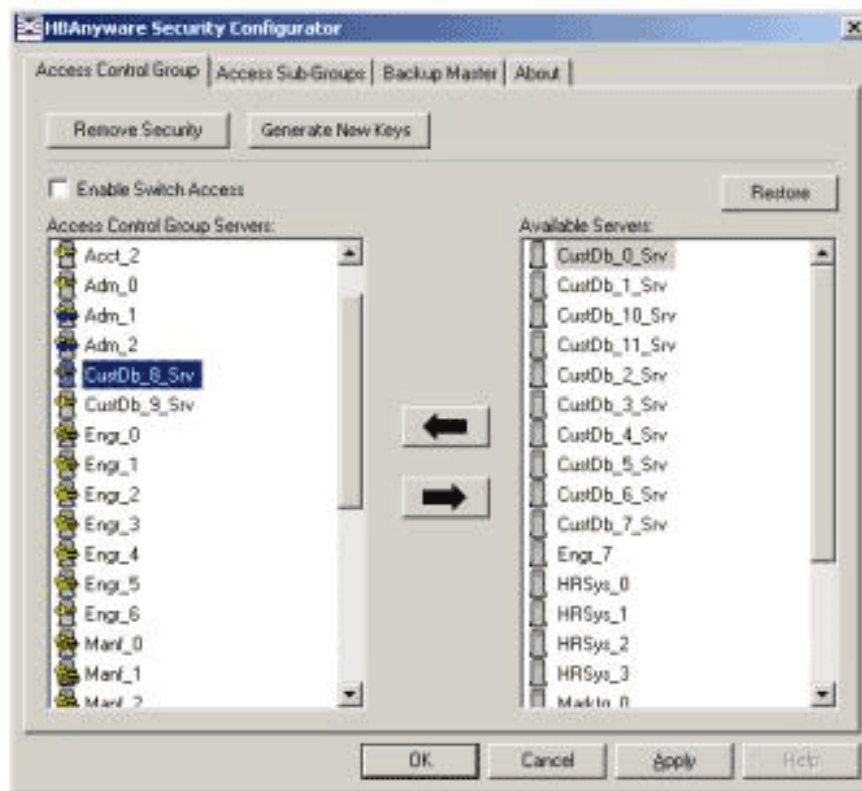
## Generate New Security Keys

You can generate new security keys only from a Master Security Client (MSC). After the new security keys are generated, they are automatically sent to all of the remote servers in the Access Control Group (ACG).

**Note** All the servers that are part of the ACG must be online when this procedure is performed so that they may receive the new keys. Any servers that do not receive the new keys will no longer be accessible remotely.

To generate new security keys for all servers in the ACG, do the following:

1. From the MSC, start the HBAnyware Security Configurator. The Access Control Group tab is displayed.



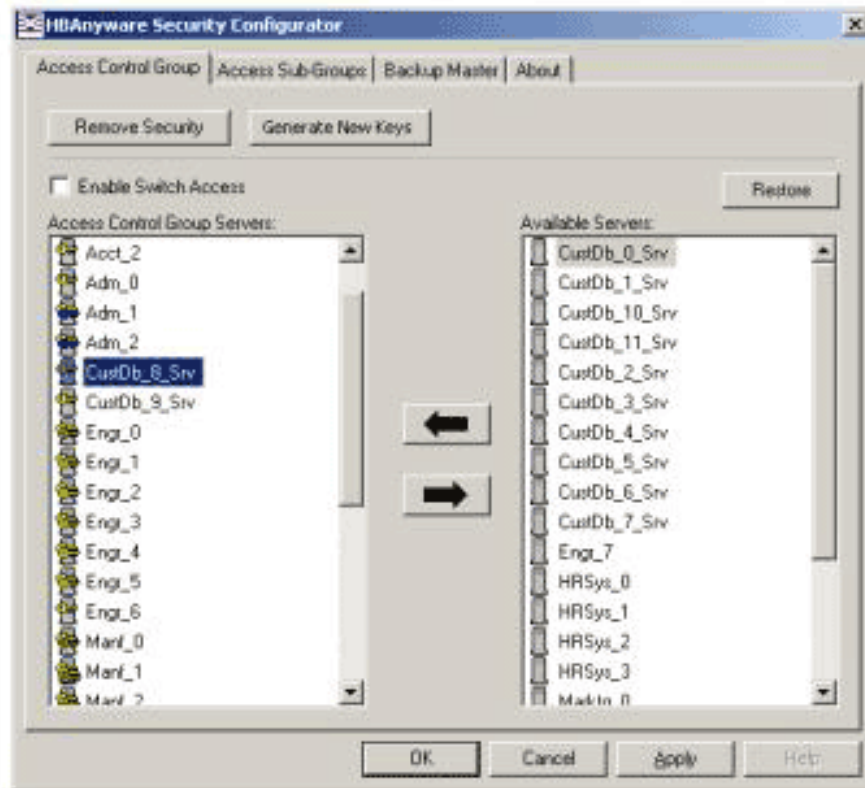
2. On the Access Control Group tab, click the Generate New Keys button. A dialog box warns you that you are about to generate new security keys for all systems.
3. Click Yes. The new keys are generated and sent to all of the remote servers in the ACG.

## Restore the ACG to Its Last Saved Configuration

You can restore the ACG to its last saved configuration, if there are unsaved changes to the ACG, only from the Master Security Client (MSC).

To restore the ACG to its last saved configuration, do the following:

1. From the Access Control Group tab on the MSC, click the Restore button.

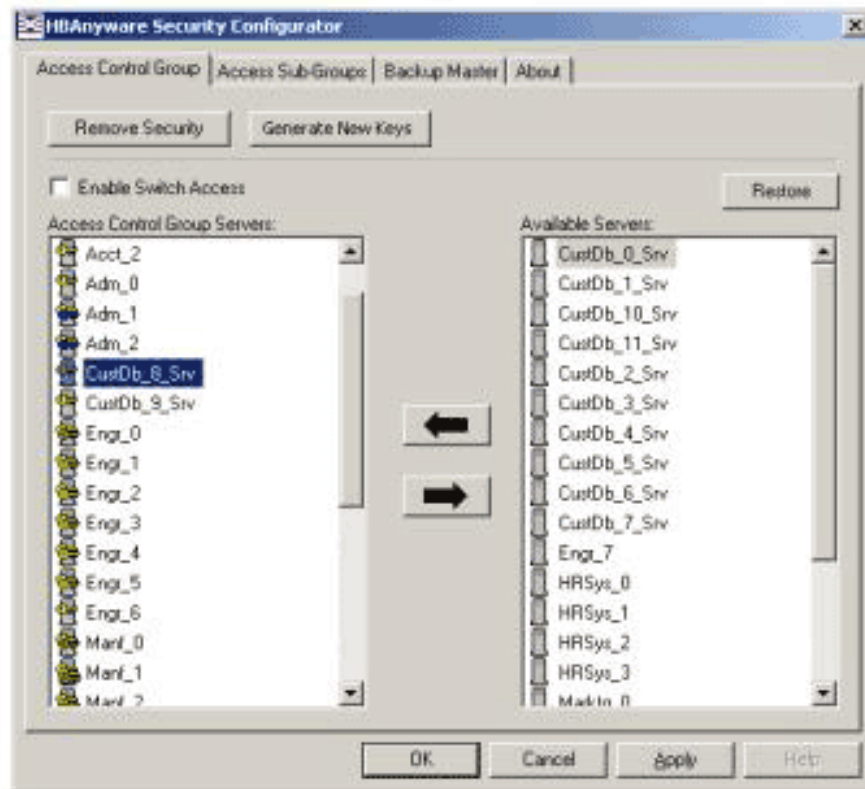


## Access a Switch

You can enable switch access only on a Master Security Client (MSC). Switch access grants the client access rights to a switch to remotely access HBAs on servers in the Access Control Group (ACG).

To enable switch access, do the following:

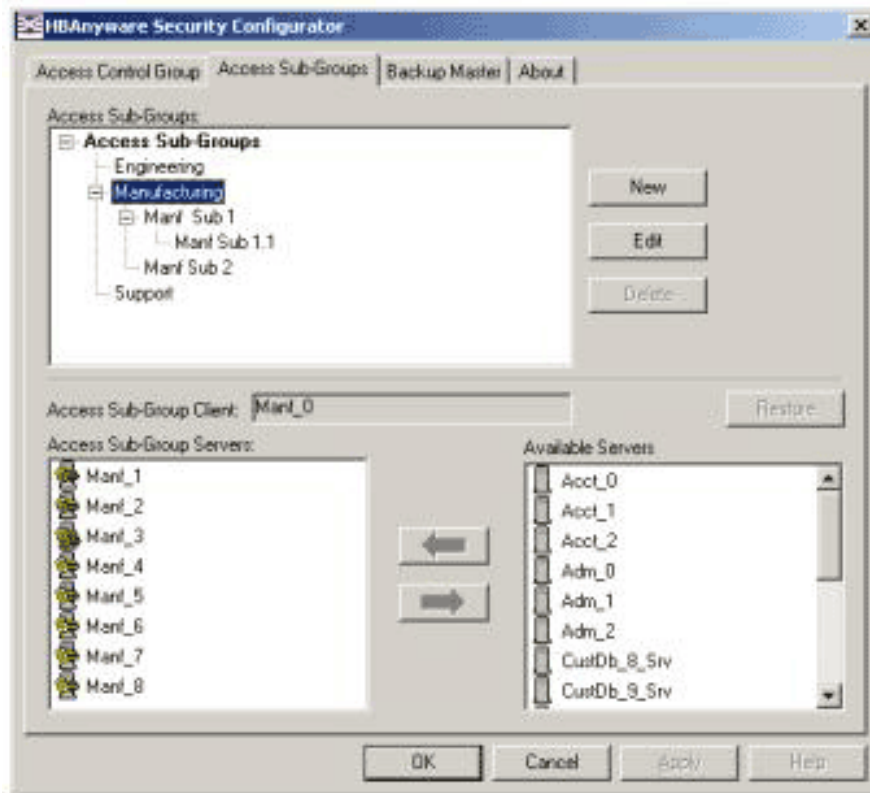
1. Start the HBAnyware Security Configurator.
2. From the Access Control Group tab, check Enable Switch Access.





## Access Sub-Groups - Introduction

The Access Sub-Group tab allows you to create multiple Access Sub-Groups (ASGs) and multiple levels (tiers) in the security topology hierarchy. The hierarchy can be as many levels deep as desired. However, it is recommended the hierarchy extend no more than three levels deep, as it becomes increasingly difficult to keep track of the topology the deeper it goes. The hierarchy of ASGs is displayed in the Access Sub-Groups tab as a tree. You can create, modify and delete ASGs at each level in this tree.



### ASG Icons

The following icons indicate the state of each of the servers in the Access Sub-Group Servers list.



The system is a server in the ASG but not in any child ASGs. You can remove it from the ASG.



The system is a server in the ASG and at least one child ASG. You cannot remove it from the ASG until you remove it from the child ASGs.





The system is a server in the ASG and a client to a child ASG. You cannot remove it from the ASG until you remove it as a client from the child ASG (by either deleting or editing the child ASG).



The system is a server in the ASG, a server in at least one other child ASG and a client to a child ASG. You cannot remove it from the ASG until you remove it from the child ASGs and as a client from the child ASG (by either deleting or editing the child ASG).



The system is a server in the ASG and a client to a non-child ASG. You can remove it from the ASG.



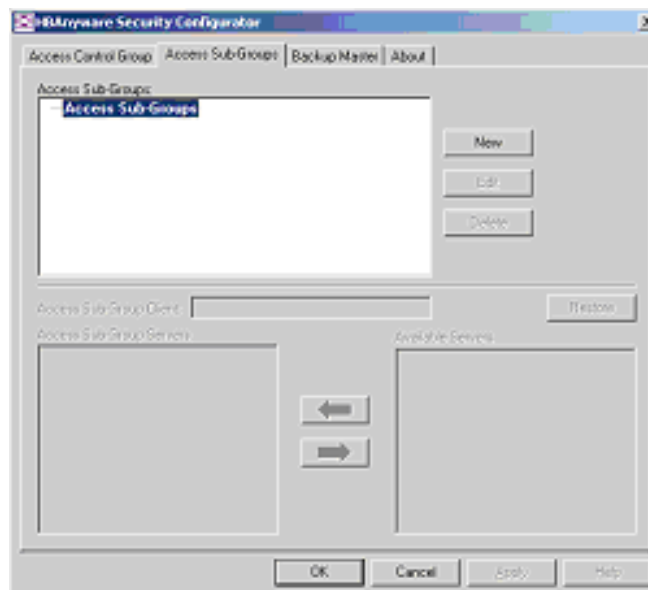
The system is a server in the ASG, a server in at least one child ASG, and a client to a non-child ASG. You cannot remove it from the ASG until you remove it from the child ASGs.

## Create an ASG

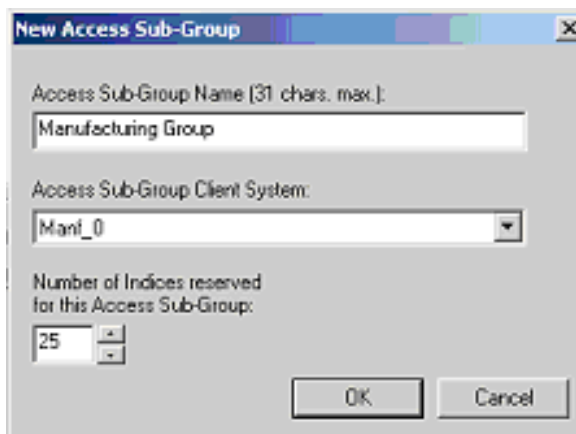
You create a new Access Sub-Group (ASG) by selecting one system from the Access Control Group (ACG) to be the client, and some or all of the other systems to be servers to this client, thus defining the new client's ACG. When the HBAnyware Security Configurator is run on the new client, the displayed ACG shows the servers that were configured in the ASG by its parent client.

To create an ASG, do the following:

1. Start the HBAnyware Security Configurator.
2. Click the Access Sub-Groups tab.



3. Click New. The New Access Sub-Group dialog box is displayed.



4. Enter the ASG information:

- Access Sub-Group Name: Enter the name of the ASG. The ASG name is for identification purposes only. It does not provide any security function. Provide a name that will make it easy to remember the systems that are part of the ASG.

The name can contain any alphanumeric characters, symbols or spaces (up to 31). At each level of the security topology, each ASG name must be unique. If the name is not unique at its level, an error message informs you of this when you press OK.

- Access Sub-Group Client System: Select the system that is to be the client.
- Number of indices reserved for this Access Sub-Group: Select the number of 'indices' you want to reserve for the client system of the new ASG. This number reflects the number of subsequent 'child' ASGs that can subsequently be created on the new client's system. See the Reserved Indices topic (under Access Sub-Groups in this manual) for examples.

5. Click OK in the New Access Sub-Group dialog box. The ASG is created.

## Reserved Indices - Examples

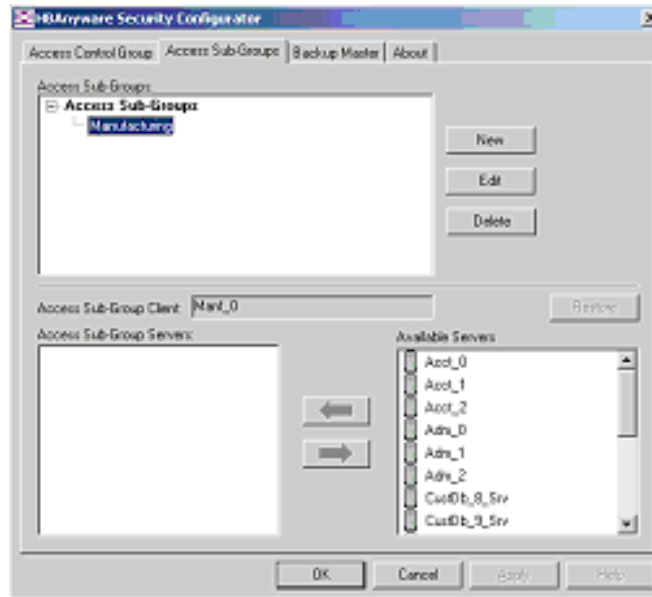
A particular security installation can support the creation of several hundred access groups (ACGs and ASGs). When you create each new access group, you allocate some number of 'indices' to the client system of the new ASG. This number reflects the number of subsequent 'child' ASGs that can subsequently be created at the new client's system.

- If zero indices are reserved, you cannot create any lower-level ASG under the client of the new ASG. Thus, for example, if you want to implement a multi-tiered security architecture consisting of many ASGs, and you wanted to create them all from the Master Security Client (MSC), zero indices would be allocated to each of the new ASGs client platforms when they are created.
- If you create an ASG, and you reserve 25 indices for the new ASG client platform, a child ASG created by this platform will have a maximum of only 24 indices available to be reserved (one is taken by the creation of the child ASG itself). This continues down the ASG hierarchy as each lower level ASG is created.
- When you create an ASG from the MSC, a maximum of 50 indices (or less if fewer are available) can be reserved. For all other clients, the maximum depends on how many indices were reserved to that client when its ASG was created, and on how many it has subsequently allocated to its ASGs.

## Add a Server to an ASG

To add a server to an ASG:

1. Start the HBAware Security Configurator.
2. Click the Access Sub-Group tab.



3. The name of the ASG is displayed in the Access Sub-Groups tree. From the Available Servers list, select the servers to be added to the ASG.
4. Click the left arrow to move the servers to the Access Sub-Group Servers list.
5. Click OK or Apply to update servers, adding them to the ASG. The new client can remotely manage the HBAs on those servers using the HBAware utility.

## Deleting an ASG

Only a leaf node ASG may be deleted (i.e. not ASGs underneath it in the tree). If an ASG has at least one child ASG, those child ASGs must be deleted first.

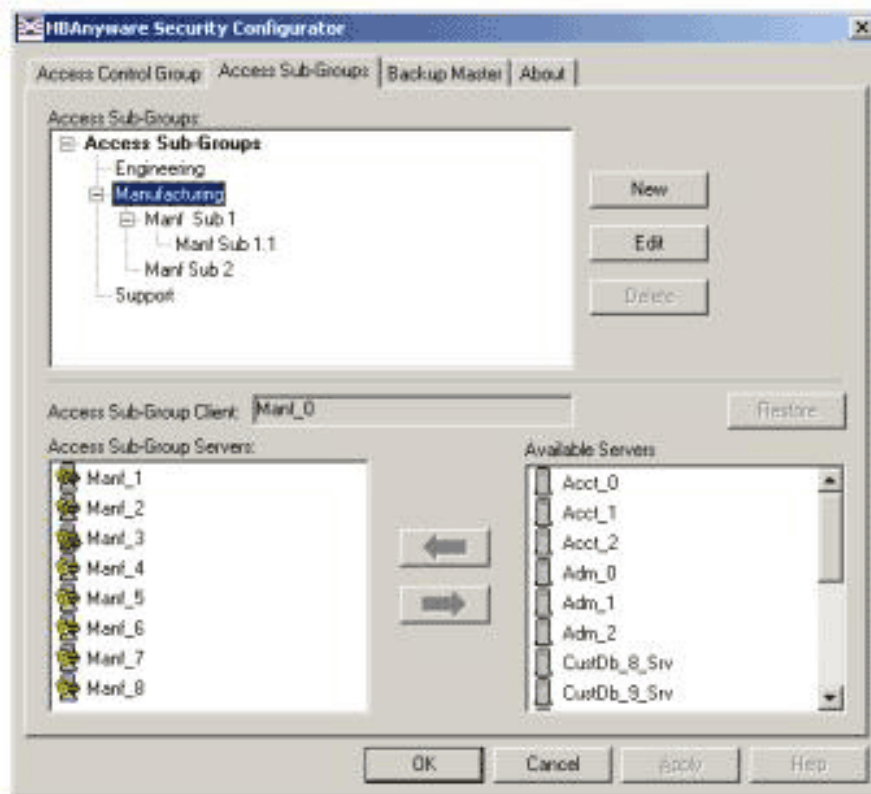
To delete an ASG:

1. From the Access Sub-Group tree, select the leaf node ASG you wish to delete.
2. Press the Delete button. A dialog box appears warning you that if you continue the access sub-group will be deleted.
3. Click Yes. This operation is immediate. There is no need to press the OK or Apply button under the tab.

## Restore an ASG to Its Last Saved Configuration

You can restore an Access Sub-Group (ASG) to its last saved configuration if there are unsaved changes to it. To restore an ASG to its last saved configuration, do the following:

1. Click the Access Sub-Group tab.



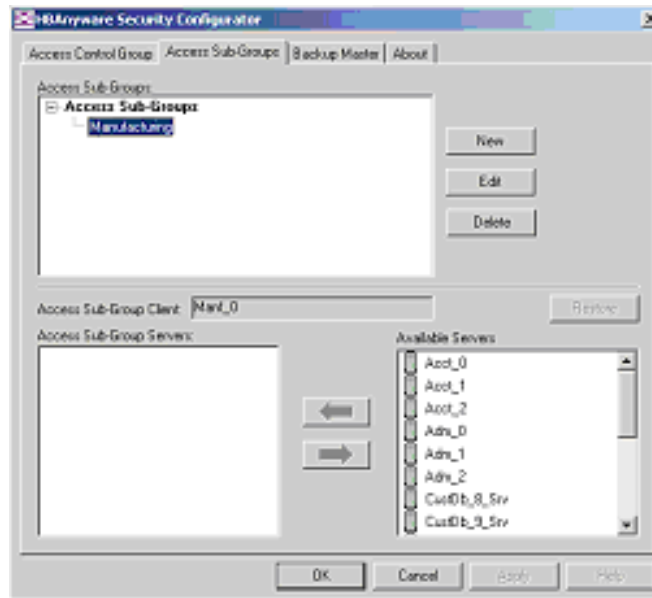
2. Select the ASG whose configuration you want to restore.
3. Click Restore.
4. Click OK or Apply to save your changes.

## Edit an ASG

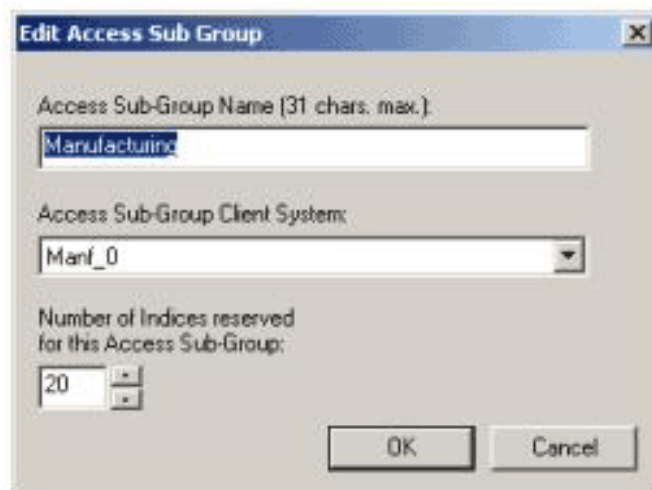
You can change the name, client system or reserved indices of an Access Sub-Group (ASG).

To edit an ASG, do the following:

1. Start the HBAware Security Configurator.
2. Click the Access Sub-Group tab.



3. Select the ASG you want to edit.
4. Click Edit. The Edit Access Sub-Group dialog box is displayed.





5. Change the ASG information:

- Access Sub-Group Name: Change the name of the ASG. The ASG name is for identification purposes only. It does not provide any security function. Provide a name that will make it easy to remember the systems that are part of the ASG.

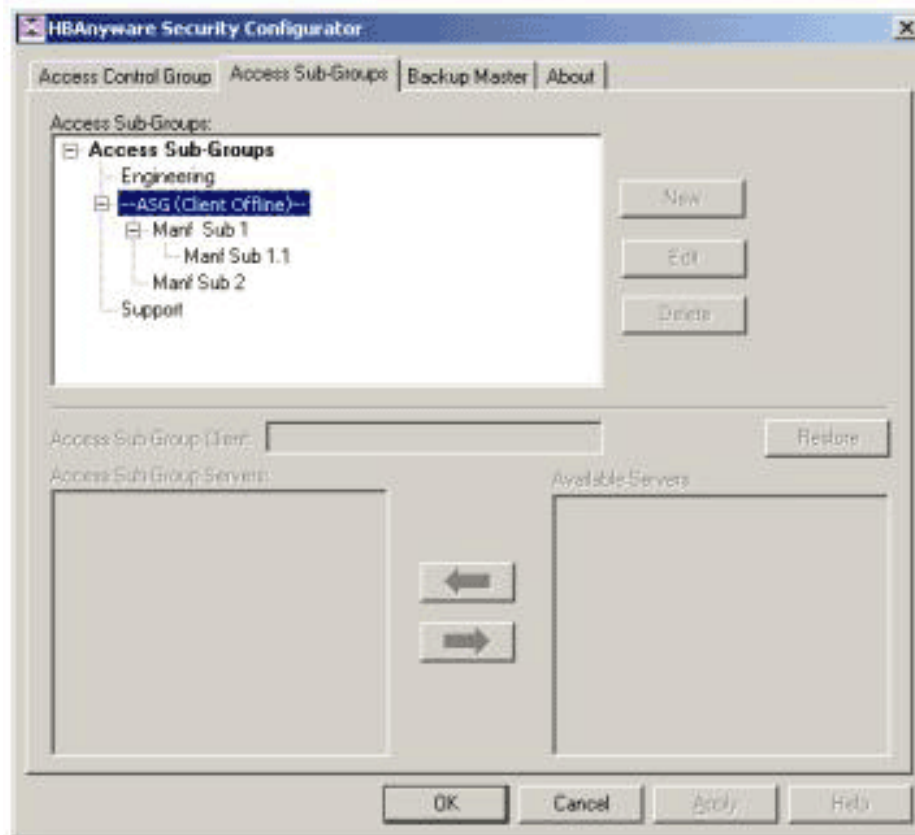
The name can contain any alphanumeric characters, symbols or spaces (up to 31). At each level of the security topology, each ASG name must be unique. If the name is not unique at its level, an error message informs you of this when you press OK.

- Access Sub-Group Client System: Select the new system that is to be the client. If the Configurator is running on a system connected to more than one fabric, the client list contains only those systems that can be accessed by the original client of the ASG.
- Number of indices reserved for this Access Sub-Group: Select the new number of 'indices' you want to reserve for the client system of the new ASG. This number reflects the number of subsequent 'child' ASGs that can subsequently be created on the new client's system. See the Reserved Indices topic (under Access Sub-Groups in this manual) for examples.

6. Click OK in the Edit Access Sub-Group dialog box to save your changes.

## About Offline ASGs

Sometimes a client system may not be online when the HBAnyware Security Configurator is running. In this case, the Access Sub-Group (ASG) for the client appears offline in the ASG tree, much like the following:



The offline ASG entry serves as a placeholder for where the real ASG would be in the tree. You cannot modify or delete the entry (although it is removed from the display if all of its child ASGs are deleted).

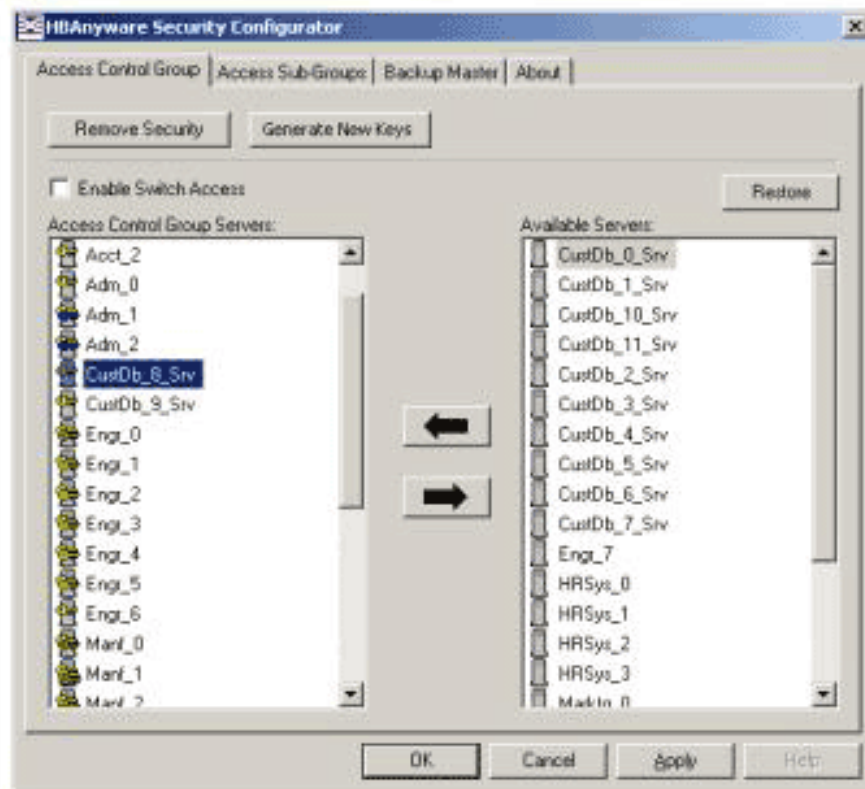
It is possible to delete the child ASGs of an offline ASG. However, it is recommended that you delete them only if the client for the offline ASG will never be put online again. It is best to delete child ASGs when the parent ASG is online.

If you choose to delete a child ASG, the operation is immediate. There is no need to press OK or Apply.

## Backup Masters - Introduction

A Backup Master mirrors the security data of the Master Security Client (MSC) in case it has to take over as the MSC if the MSC becomes unable to operate or is removed from the security configuration. A Backup master system receives all the updates to the security configuration on the MSC. However, you cannot make modifications to the security configuration on a Backup Master.

When the Configurator runs on a Backup Master, the Access Control Group tab looks like the tab on a non-MSC system. The Access Sub-Group tab displays the ASGs, but you cannot change the ASGs.



The Backup Master tab is available only when the HBAAnyware Security Configurator is running on the MSC or a Backup Master. Use this tab to set up a system as a Backup Master to the MSC and to replace the MSC with a Backup Master.

Each time the HBAAnyware Security Configurator is started on the MSC and no Backup Master is assigned, a message warns you that no Backup Master Client is assigned to the security configuration.

If you run the HBAAnyware Security Configurator on a Backup Master, a message warns you that you can only view security information on a Backup Master. Security changes must be made to the MSC.

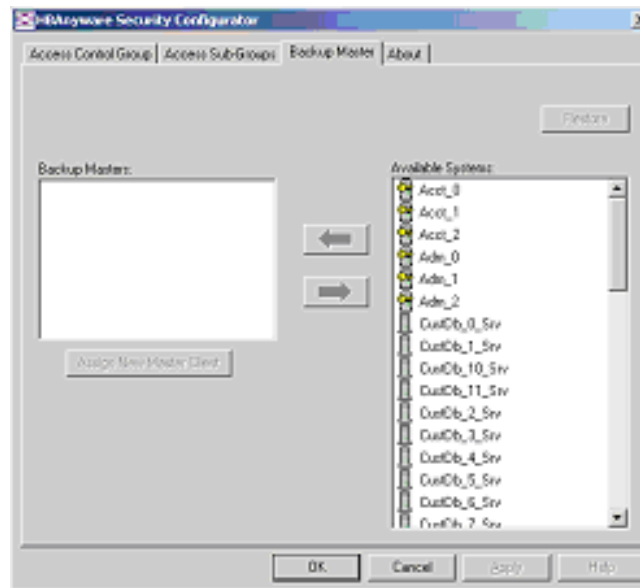
Because a Backup Master system receives all the updates that the MSC makes to the security configuration, it is very important that the Backup Master is online when the HBAnyware Security Configurator is running on the MSC. Otherwise, updates to the security configuration are not reflected to the Backup Master. If the Backup Master then becomes the MSC, the security configuration may be corrupted.

## Backup Master Eligible Systems

In order to be eligible to become a Backup Master, a system must not be a client or server in any ASG. In other words, it must be either a server in the MSC's Access Control Group (ACG) or an unsecure system. If it is an unsecure system, it will be secure when it becomes a Backup Master.

## Backup Master Tab and Controls

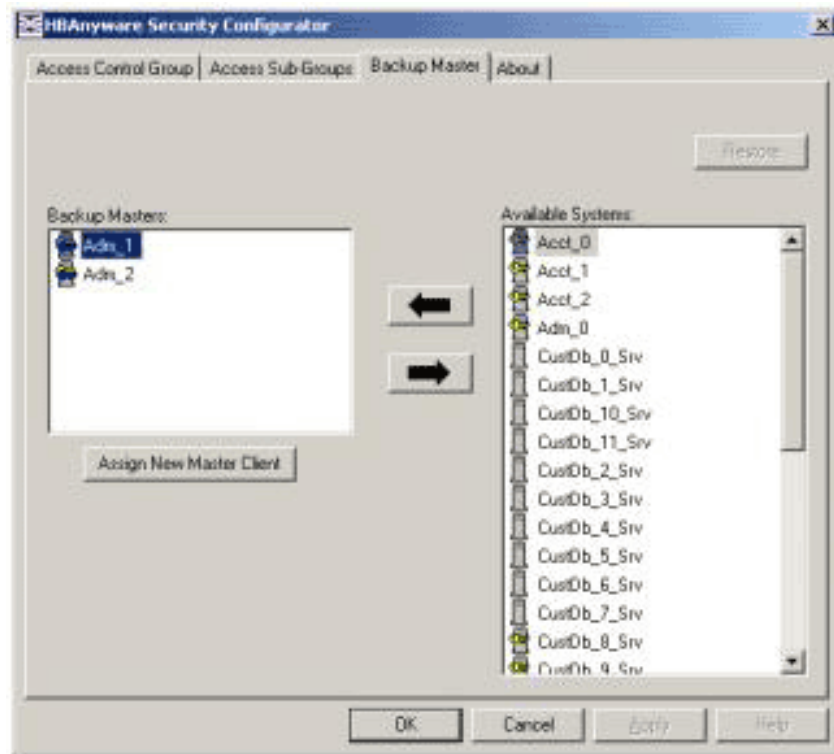
The first time the Backup Master tab is selected on the MSC, it looks similar to the following:



## Create a Backup Master

To create a Backup Master, do the following:

1. On the Master Security Client (MSC), start the HBAware Security Configurator.
2. Click the Backup Master tab.



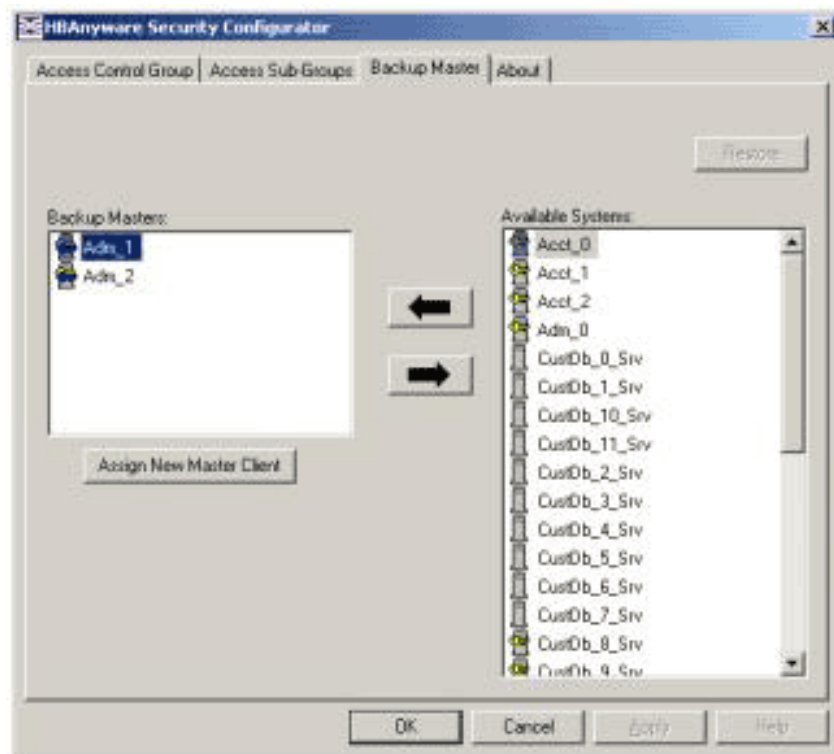
3. Select a system from the Available Systems list.
4. Click the left arrow to move the system to the Backup Masters list.
5. Click OK or Apply to save your changes.

## Reassign a Backup Master as the New MSC from the Old MSC

Because a Backup Master may have to take over as the Master Security Client (MSC), it should be able to physically access all of the HBAs that the MSC can access. If the MSC is connected to multiple fabrics, its Backup Master should be selected from the Available Systems list that is connected to the same fabrics as the MSC.

To reassign a Backup Master as the new MSC from the old MSC, do the following:

1. On the MSC, start the HBAware Security Configurator.
2. Click the Backup Master tab.



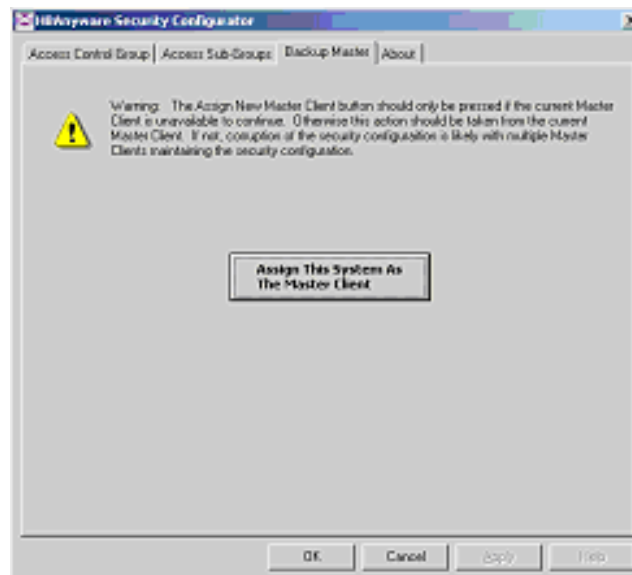
3. In the Backup Masters list, select the Backup Master system that you want to reassign as the MSC.
4. Click Assign New Master Client. You will be asked if you wish to proceed.
5. Click Yes. The selected Backup Master becomes the new MSC. The current MSC becomes a server in the new MSC's ACG. After the changes are made, a message indicates that the reassignment is complete.
6. Click OK. The Configurator closes because the system is no longer the MSC.

## Reassign a Backup Master as the New MSC from the Backup Master

**Warning** Use this method only if the MSC cannot relinquish control to a Backup Master. For example, if the MSC is no longer bootable or able to connect to the Fibre Channel network. Under any other circumstances, if the Backup Master takes over as the MSC, and the MSC is still running or comes back online later, there will be two MSCs for the same security configuration. This will eventually lead to corruption of the security configuration.

To reassign a Backup Master as the new MSC from the Backup Master, do the following:

1. On the Backup Master system that you want to reassign as the MSC, start the HBAware Security Configurator.
2. Click the Backup Master tab.



3. Click Assign This System As The Master Client. A prompt asks if you want to continue.
4. Click Yes. A prompt notifies you that this system is now the new MSC.
5. Click OK. The Configurator closes. Restart the HBAware Security Configurator to run the former Backup Master as the MSC.



## **Emulex Driver for Linux Troubleshooting Manual**

### **Version 7.1**

### **Table of Contents**

- [Introduction](#)
- [Driver Install Fails](#)
  - ["No Module Ipfc Found for Kernel" Error Message](#)
  - [Recently Upgraded Kernel Cannot Find Ramdisk](#)
  - [Driver Does Not Load in Ramdisk for a Custom Built Kernel](#)
  - [Driver is Not Loaded after System Reboot](#)
- [Driver Uninstall Fails](#)
- [Linux Install Script Exit Codes](#)
- [Cannot Install HBAnyware](#)
- [Cannot Install the Security Configurator](#)
- [SCSI Only Sees 8 LUNs When More Are Present](#)
- ["attached usage count = -1" Error Message](#)
- ["Unkown Device" Error Message](#)
- ["No Such Device" Error Message](#)
- [Operating Error Occurs when Attempting to Run HBAnyware](#)
- [Cannot See any HBAs](#)
- [Cannot See Other HBAs or Hosts](#)



- [Cannot See Multiple Zones from the Management Server](#)
- [SAN Management Workstation Does Not Have Fibre Channel Connection](#)
- [Cannot See New LUNS](#)
- [HBAnyware Appears on Remote Servers](#)
- [Cannot Access Formerly Accessible Servers Via the HBAnyware Security Configurator or the HBAnyware Utility](#)

## ACG

- [All Servers Are Not Displayed](#)
- [Cannot Add or Remove a Server](#)
- [HBAnyware Utility Shows Non-ACG Servers](#)

## ASG

- [ASG Looks Non-Hierarchical](#)
- [Cannot Add or Remove a Server](#)
- [Label in the ASG Display Shows"- ASG \(Client Offline\) -"](#)
- [Not All Servers Are Available to an ASG](#)

## Backup Master

- [Cannot Create a Backup Master](#)
- [Cannot Modify the Security Configuration](#)
- [No Backup Master and MSC Is Not Available](#)
- [Tab Not Available](#)

## Error Message Appears When

- [Creating an ASG](#)
- [Deleting an ASG](#)
- [Starting the Security Configurator](#)
- [No Backup Master Client Systems Assigned](#)
- [Utility is Running on an Unsecure System](#)
- [System is a Backup Master Client System](#)

## MSC

- [MSC is Not Bootable or Cannot Connect to FC Network](#)
- [New Keys Were Generated While Servers Were Offline](#)
- [Security Removed While Servers Were Offline](#)

## Miscellaneous

- [Cannot Run the Configurator on a System Configured for Secure Access Only](#)

## Ipfc Log Messages

[Introduction](#)

[ELS Events](#)

[Link Discovery Events](#)

[Mailbox Events](#)

[Initialization Events](#)

[FCP Traffic History](#)

[Node Table Events](#)

[FCP Target Mode Events](#)

[Miscellaneous Events](#)

[Link Events](#)

[SLI Events](#)

[IOCTL Events](#)

## Introduction

There are several circumstances in which your system may operate in an unexpected manner. The Troubleshooting manual explains many of these circumstances and offers one or more workarounds for each situation.

**Note** The appearance of HBAware screens may vary slightly depending upon the operating system in use.

## Driver Install Fails

### Situation:

The Linux install script fails to install the driver.

### Resolution:

The install script may fail for the following reasons:

- A previous version of the driver is installed. Run the Linux Install --uninstall script and then try to install the driver.
- The current driver is already installed.

See the Emulex Driver for Linux Installation Manual for more information.

## "Rmmod fails to unload driver due to Device or resource busy." Error Message

### Situation:

"Rmmod fails to unload driver due to Device or resource busy." This message occurs when you attempt to remove the driver without first stopping HBAnyware, when HBAnyware is installed and running.

### Resolution:

1. Stop HBAnyware before attempting to unload the driver. The script is located in the /usr/sbin/hbanyware directory. Type:

```
./stop_hbanyware
```

- 2.

Unload the driver. Type:

```
rmmod lpfcdfc  
rmmod lpfc
```

## "No Module Ipfc Found for Kernel" Error Message

### Situation:

When upgrading the kernel, rpm generates the following error: "No module lpfc found for kernel KERNELVERSION" .

### Resolution:

There are two ways to install the driver into an upgraded kernel. The method you use depends on whether or not you are upgrading the driver.

- You can upgrade the kernel using the same version of the driver.
- You can upgrade the kernel using a new version of the driver.

### To upgrade the kernel with the same version of the lpfc driver kit installed:

1. Copy the /etc/lpfc.conf file to a safe location; for example, to /etc/lpfc.conf.backup.  
Type:

```
cp /etc/lpfc.conf /etc/lpfc.conf.backup
```

2. Uninstall the Emulex driver. Type:

```
lpfc-install --uninstall
```

3. Upgrade the kernel and/or distribution.
4. Reboot the system with the new kernel.
5. Re-install the Emulex driver with the lpfc.conf file; to use the previous example, /etc/lpfc.conf.backup. Type:

```
lpfc-install -c /etc/lpfc.conf.backup
```

6. Reboot the system to complete re-installation of the Emulex drivers.

**To upgrade the kernel with a new version of the lpfc driver kit installed:**

1. Copy the /etc/lpfc.conf file to a safe location; for example, /etc/lpfc.conf.backup. Type:

```
cp /etc/lpfc.conf /etc/lpfc.conf.backup
```

2. Uninstall the Emulex driver. Type:

```
lpfc-install --uninstall
```

3. Upgrade the kernel and/or distribution.
4. Reboot the system with the new kernel.
5. Install the new Emulex driver. Do NOT use the backup lpfc.conf file. Type:

```
lpfc-install
```

6. Add custom configuration lines to the new /etc/lpfc.conf, using the backup lpfc.conf file as a reference.
7. Rebuild the driver with the new /etc/lpfc.conf changes.

```
cd /usr/src/lpfc  
make  
make install
```

8. Rebuild the ramdisk image with the new lpfc driver. Type:

```
lpfc-install --createramdisk
```

9. Reboot the system to complete the re-installation of the Emulex drivers.



## Recently Upgraded Kernel Cannot Find Ramdisk

### Situation:

After upgrading the kernel, the kernel cannot find the ramdisk which halts or panics the system.

### Resolution:

There are two ways to install the driver into an upgraded kernel. The method you use depends on whether or not you are upgrading the driver.

- You can upgrade the kernel using the same version of the driver.
- You can upgrade the kernel using a new version of the driver.

### To upgrade the kernel with the same version of the lpfc driver kit installed:

1. Copy the /etc/lpfc.conf file to a safe location; for example, to /etc/lpfc.conf.backup.  
Type:

```
cp /etc/lpfc.conf /etc/lpfc.conf.backup
```

2. Uninstall the Emulex driver. Type:

```
lpfc-install --uninstall
```

3. Upgrade the kernel and/or distribution.
4. Reboot the system with the new kernel.
5. Re-install the Emulex driver with the lpfc.conf file; to use the previous example, /etc/lpfc.conf.backup. Type:

```
lpfc-install -c /etc/lpfc.conf.backup
```

6. Reboot the system to complete re-installation of the Emulex drivers.

**To upgrade the kernel with a new version of the lpfc driver kit installed:**

1. Copy the /etc/lpfc.conf file to a safe location; for example, /etc/lpfc.conf.backup. Type:

```
cp /etc/lpfc.conf /etc/lpfc.conf.backup
```

2. Uninstall the Emulex driver. Type:

```
lpfc-install --uninstall
```

3. Upgrade the kernel and/or distribution.
4. Reboot the system with the new kernel.
5. Install the new Emulex driver. Do NOT use the backup lpfc.conf file. Type:

```
lpfc-install
```

6. Add custom configuration lines to the new /etc/lpfc.conf, using the backup lpfc.conf file as a reference.
7. Rebuild the driver with the new /etc/lpfc.conf changes.

```
cd /usr/src/lpfc  
make  
make install
```

8. Rebuild the ramdisk image with the new lpfc driver. Type:

```
lpfc-install --createramdisk
```

9. Reboot the system to complete the re-installation of the Emulex drivers.

## Driver Does Not Load in Ramdisk for a Custom Built Kernel

### Situation:

The Emulex driver for Linux does not load in ramdisk for a custom built kernel.

### Resolution:

Custom built kernels are not supported by Emulex. However, the Emulex install script will attempt to install the driver into a ramdisk that follows the naming scheme used by Red Hat or SLES kernels.

- The Red Hat naming scheme for IA64 ramdisk images is:

```
/boot/efi/efi/redhat/initrd-KERNELVERSION.img
```

- The Red Hat naming scheme for ramdisk images on all other architectures is:

```
/boot/initrd-KERNELVERSION.img
```

If a custom built kernel has a ramdisk image that does not follow the appropriate naming scheme, the name of the image can be changed using the following procedure:

1. Change the name of the ramdisk image to match either the Red Hat or SLES naming scheme, depending on the distribution being used.
2. Update any file links to the ramdisk image.
3. Edit the boot loader configuration file (i.e., /etc/lilo.conf, /boot/grub/grub.conf, /boot/grub/menu.lst, /etc/yaboot.conf), find any references to the old ramdisk image name, and replace them with the new name.
4. Reboot the system to verify the changes.
5. Install the Emulex lpfc Linux driver kit.

## Driver is Not Loaded after System Reboot After Upgrading The Kernel

### Situation:

The driver is not loaded when the system is rebooted after upgrading the kernel.

### Resolution:

There are two ways to install the driver into an upgraded kernel. The method you use depends on whether or not you are upgrading the driver.

- You can upgrade the kernel using the same version of the driver.
- You can upgrade the kernel using a new version of the driver.

### To upgrade the kernel with the same version of the lpfc driver kit installed:

1. Copy the /etc/lpfc.conf file to a safe location; for example, to /etc/lpfc.conf.backup. Type:

```
cp /etc/lpfc.conf /etc/lpfc.conf.backup
```

2. Uninstall the Emulex driver. Type:

```
lpfc-install --uninstall
```

3. Upgrade the kernel and/or distribution.
4. Reboot the system with the new kernel.
5. Re-install the Emulex driver with the lpfc.conf file; to use the previous example, /etc/lpfc.conf.backup. Type:

```
lpfc-install -c /etc/lpfc.conf.backup
```

6. Reboot the system to complete re-installation of the Emulex drivers.

**To upgrade the kernel with a new version of the lpfc driver kit installed:**

1. Copy the /etc/lpfc.conf file to a safe location; for example, /etc/lpfc.conf.backup. Type:

```
cp /etc/lpfc.conf /etc/lpfc.conf.backup
```

2. Uninstall the Emulex driver. Type:

```
lpfc-install --uninstall
```

3. Upgrade the kernel and/or distribution.
4. Reboot the system with the new kernel.
5. Install the new Emulex driver. Do NOT use the backup lpfc.conf file. Type:

```
lpfc-install
```

6. Add custom configuration lines to the new /etc/lpfc.conf, using the backup lpfc.conf file as a reference.
7. Rebuild the driver with the new /etc/lpfc.conf changes.

```
cd /usr/src/lpfc  
make  
make install
```

8. Rebuild the ramdisk image with the new lpfc driver. Type:

```
lpfc-install --createramdisk
```

9. Reboot the system to complete the re-installation of the Emulex drivers.

## Driver Uninstall Fails

### Situation:

The lpfc-install --uninstall script fails with an error.

### Resolution:

Try the following solutions:

1. Unmount all FC disk drives.
2. Uninstall the HBAnyware and SSC software packages. These can be removed by running the ./uninstall script from the installation directory.
3. Unload the lpfc and/or lpfcdfc driver.

## Linux Install Script Exit Codes

The lpfc-install script contains exit codes that can be useful in diagnosing installation problems. Refer to the lpfc-install script for a complete listing of codes and definitions.

## Cannot Install HBAnyware

### Situation:

The HBAnyware software package will not install. An error message states that:

```
inserv Service Elxlpfc has to be enabled for service ElxDiscSrv
inserv: exiting now
/sbin/inserv failed exit code 1
```

### Resolution:

Re-install the ./lpfc\_install script.



## Cannot Install the Security Configurator

### **Situation:**

The HBAnyware Security Configurator software package will not install. An error message states that the latest version of HBAnyware must be installed first.

### **Resolution:**

The system either has no HBAnyware software installed or has an older version of the HBAnyware software installed. In either case, obtain the latest version of the HBAnyware software and follow the installation instructions. Remember to install the HBAnyware software before installing the HBAnyware Security Configurator package.

## SCSI Only Sees 8 Luns When More Are Present

### Situation:

SCSI only sees 8 luns when more are present.

### Resolution:

Some SCSI drivers will not scan past 8 luns when the target reports as a SCSI-2 device. Force SCSI bus scan with `/usr/sbin/lpfc/lun_scan`. SuSE supplies `/bin/rescan-scsi-bus.sh` which can be changed to scan everything.

## "attached usage count = -1" Error Message

### Situation:

Some distributions of SuSE Linux Enterprise Server 8 do not handle Peripheral Qualifier Bits set to "1" in the Inquiry response correctly. This can cause the "attached usage count = -1" error message to appear in the console while unloading the lpfc driver followed by a panic.

There are two possible causes:

1. A LUN scan utility issues INQUIRY commands to non existent LUNS.
2. A storage array (i.e., NEC, Fujitsu, Clariion storage arrays) returns offline LUNs in the report LUN response data. This causes the SCSI midlayer to an issue an INQUIRY command to an offline LUN resulting in the error.

### Resolution:

If you need to run a LUN scan script on a Linux distribution that does not support the peripheral qualifier bit set to 1, you must set the `lpfc_inq_pqb_filter` configuration parameter to 1.

If you need to attach Linux distributions with this issue to an NEC istorage array, you must set the `lpfc_lun_skip` parmeter to 1.

These parameters are contained in the `lpfc.conf` file. Refer to the "View the `lpfc.conf` Configuration File" topic in the Configuration manual to learn how to change these parameters.

## "Unknown Device" Error Message

### Situation:

You type "lspci" at the command prompt to display all pci devices attached to your system. The Emulex LP1050 and LP10000 series host bus adapters may be listed as:  
Fibre Channel: Emulex Corporation: Unknown device

### Resolution:

The LP1050 and LP10000 series HBAs are Emulex's newest HBAs and have not been incorporated into RedHat's or SuSE's official PCI list. These HBAs have been submitted to those organizations and will be included in their next maintenance release.

### Workaround:

Use HBAnyware or lputil to display all Emulex HBAs installed in your system.

## "No Such Device" Error Message

### **Situation:**

You are attempting to load the lpfc driver, but have no HBAs installed. The "no such device" error will be attached to the /directory path/lpfc.o file. You will also see the error "Error loading LPFC Driver".

### **Resolution:**

Install an Emulex HBA and reload the driver. If the system supports "Hot Swap", ensure that there is power to the HBA by viewing its LEDs.

## Operating Error Occurs When Attempting to Run HBAnyware

### Situation:

When you attempt to run HBAnyware, an operating system error may occur. The computer may freeze.

### Resolution:

Reboot the system.

## Cannot See Any HBAs

### Situation:

You launch HBAnyware and no HBAs are visible.

### Resolution:

Try the following solutions:

1. Perform an 'lsmod' to see if the Emulex drivers (lpfc and lpfcdfc) are loaded. Look for an error message on the command line stating the lpfcdfc driver is not loaded. If this is the case, do an insmod of the lpfc and lpfcdfc drivers and re-launch HBAnyware.
2. Exit HBAnyware and run `./stop_hbanyware`. Then run `./start_rmserver` and `./start_elxdiscovery`, and re-launch HBAnyware. The HBAs should be visible. If they are not visible reboot your system.

## Cannot See Other HBAs or Hosts

### Situation:

Although HBAnyware is installed, only local host bus adapters (HBAs) are visible. The other HBAs and hosts in the SAN cannot be seen.

### Resolution:

HBAnyware uses in-band data communication, meaning that the management server running HBAnyware must have a physical Fibre Channel connection to the SAN. All the HBAs in the SAN will be visible if:

1. The other servers have a Fibre Channel connection to your zone of the SAN. Check fabric zoning.
2. Ensure that rmserver processes are running on remote hosts (For Linux/Solaris systems, enter `ps -ef | grep rmserver`).
3. All other HBAs are running HBAnyware and the appropriate driver.
4. The other HBAs are Emulex HBAs.

**Note** HBAnyware must be running on all remote hosts that are to be discovered and managed.

Remote capabilities of HBAnyware are subject to fabric zoning configuration. Remote hosts to be discovered and managed by HBAnyware must be in the same zone.



## Cannot See Multiple Zones from the Management Server

### **Situation:**

Cannot see multiple zones on the same screen of my management server running HBAnyware.

### **Resolution:**

Provide a physical Fibre Channel connection into each of the zones. For each zone you want to see, connect an Emulex HBAnyware enabled port into that zone.

## **SAN Management Workstation Does Not Have a Fibre Channel Connection**

### **Situation:**

The SAN management workstation does not have a physical Fibre Channel connection into the SAN because the other management tools are all out-of-band. Can HBAnyware be run on this SAN management workstation?

### **Resolution:**

From the SAN management workstation, run a terminal emulation session into one of the servers that has HBAnyware loaded on it. For Windows servers, use the operating system's terminal services option. On Solaris, AIX, HP-UX or Linux servers, open an X-Windows session to run the server's HBAnyware GUI remotely.

## Cannot See New LUNs

### Situation:

Although new LUNs were created on the storage array, they do not appear in HBAnyware.

### Resolution:

- Refresh the screen.
- Exit HBAnyware and restart HBAnyware. If new LUNs are visible, you are finished. If that doesn't work, try the following:
  1. Exit HBAnyware.
  2. Navigate to `/usr/sbin/hbanyware`.
  3. Run `./stop_hbanyware` to stop both the `rmserver` and `elxdiscovery` processes.
  4. Run `./start_rmserver` and `./start_elxdiscovery` to restart both processes.

## HBAnyware Appears on Remote Servers in the SAN

### Situation:

HBAnyware appears on remote servers in the SAN.

### Resolution:

To prevent HBAnyware from appearing on remote servers in the SAN, do one of the following:

- In Windows, disable the HBAnyware service.
- In Solaris, disable the rmserver process.
- In Linux, disable the rmserver process:
  1. Navigate to `/usr/sbin/hbanyware`.
  2. Run `./stop_hbanyware` to stop both the rmserver and elxdiscovery processes.
  3. Run `./start_rmserver` and `./start_elxdiscovery` to restart both processes.

Disabling this service or process prevents the local servers from being seen remotely.

## **Cannot Access Formerly Accessible Servers Via the HBAware Security Configurator or the HBAware Utility**

### **Situation:**

Cannot Access Formerly Accessible Servers Via the HBAware Security Configurator or the HBAware Utility

### **Resolution:**

This is actually a symptom of two different problems. See the following troubleshooting topics in the MSC section of this manual:

- New Keys Were Generated While Servers Were Offline
- Security Removed While Servers Were Offline

## All Servers Are Not Displayed

### Situation:

When I run the HBAware Security Configurator on the MSC, I do not see all of the systems in Available Servers or Access Control Group Servers lists.

or

When I run the HBAware Security Configurator on a non-MSC, I do not see all of the systems I should see in the Access Control Group Servers list.

### Resolution:

Make sure all of the systems are connected to the Fibre Channel network and are online when you start the Configurator. Discovery of the systems is done only once, at startup. Unlike the HBAware utility, there is no Rediscover Devices button. Therefore, the Configurator must be restarted to rediscover new systems.

## Cannot Add or Remove a Server

### **Situation:**

The HBAnyware Security Configurator shows only a list of the systems in this system's ACG. I cannot add or remove systems from the ACG.

### **Resolution:**

This is normal. You can modify the ACG for your system only on the MSC or on a parent client system.

## HBAnyware Utility Shows Non-ACG Servers

### **Situation:**

The HBAnyware utility shows servers that are part of the ACG and that are not part of the ACG.

### **Resolution:**

The HBAnyware utility discovers unsecured servers as well as servers that are part of its ACG. The servers that you see that are not part of the ACG are unsecured. They will be discovered by any system running the HBAnyware utility on the same Fibre Channel fabric.



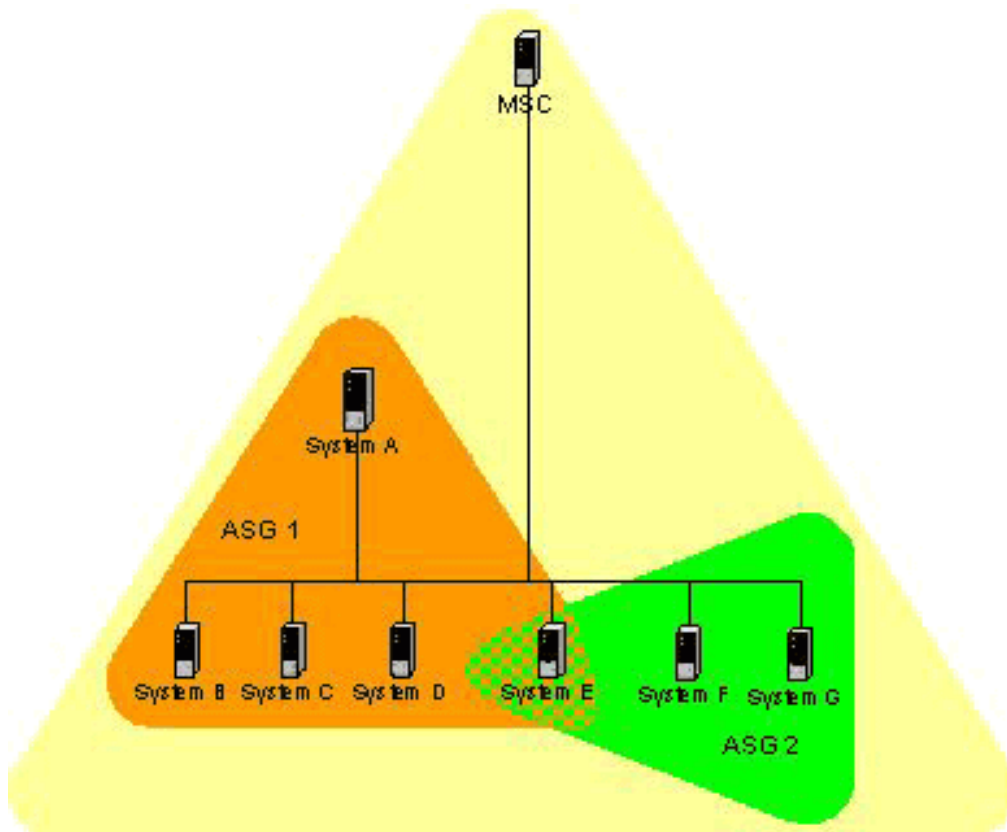
## ASG Appears to Be Non-Hierarchical

### Situation:

It is possible from a higher-level client (such as the MSC) to create an ASG 1 with system A as the client and systems B, C, D, and E as servers. Then create an ASG 2 with system E as the client, but with systems F and G as servers even though F and G are not part of ASG 1. This makes the topology non-hierarchical.

### Resolution:

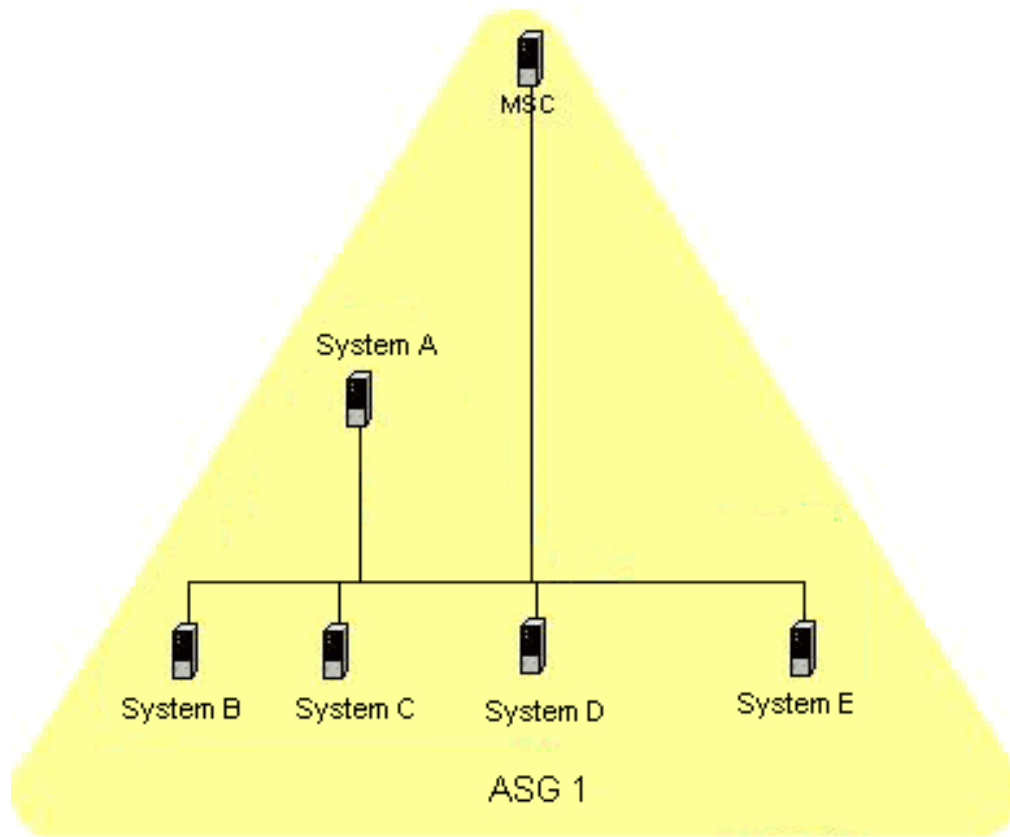
This scenario is shown in the following picture:



System E is part of ASG 1, but has been made a client of ASG 2, and both of the servers in ASG 2 are not part of ASG 1. You could not create this ASG on system A, but you could on the MSC (or on a parent client) because it can access systems F and G. Although not shown in the picture, it is also possible to make system A a server in ASG 2, creating a case where system A and system E are both clients and servers to/of each other.

While the Configurator will allow you to set up ASGs this way, it is best not to create a topology like this as it can lead to confusion. The best way to set up an ASG is to set up

the ASG on the MSC (or a higher-level parent) where the clients and servers do not cross over into other ASGs like in the picture below. Then set up ASGs on clients of those ASGs in the same manner, keeping the topology hierarchical.



## Cannot Add or Remove a Server

### **Situation:**

You cannot add or remove a server.

### **Resolution:**

When all of the systems in an ACG are running on a single fabric, they are all available to be added to any ASG. However, if the client is connected to more than one fabric, it is possible that not all of the servers in the client's ACG are physically accessible by a chosen client for an ASG. In this case, those servers are not available to be added to that ASG.

If you add a system to an ASG as a server, and then make the system a client to a child ASG, you cannot remove it from the ACG it belongs to as a server until you delete the ASG that it is a client to.

Before you delete a server from an ASG, you must first remove the server from any lower level ASGs to which it belongs.

## The Label in the ASG Display Shows "- ASG (Client Offline) -"

### **Situation:**

In the ASG tree of the Access Sub-Groups tab, one or more of the names of the ASGs is displayed as "- ASG (Client Offline) -"

### **Resolution:**

The client system for the ASG was not discovered when the Configurator was started. See the following troubleshooting topics:

- All Servers Are Not Displayed
- New Keys Were Generated While Servers Were Offline

## Not All Servers Are Available to an ASG

### Situation:

When you create a new ASG or modify an existing ASG, not all of the servers in the ACG are available to be added to the ASG.

### Resolution:

A client system can be connected to more than one fabric. While the system the Configurator is running on may be able to access all of the servers in its ACG, it is not necessarily the case that the selected client for the ASG can access all of the servers. Only those that can be accessed by the selected server will be available.

## Cannot Create a Backup Master

### **Situation:**

You cannot create a Backup Master.

### **Resolution:**

You select a system (or group of systems) from the MSC to be the Backup Master. The system must be either an unsecured system (which will be secured by being made a Backup Master), or a system that is not part of any ASG (client or server). These systems will mirror the MSC's security configuration.

Because the Backup Master may some day take over as the MSC, the Backup Master must be able to physically access all of the systems that the MSC can access. Therefore, if the MSC is connected to multiple fabrics, the Backup Master also must be connected to those same fabrics. When you select a Backup Master, the HBAware Security Configurator displays a warning if it detects that the system selected to be a Backup Master is not able to physically access the same systems that the MSC can access.

## Cannot Modify the Security Configuration

### **Situation:**

You cannot modify the security configuration.

### **Resolution:**

You select a system (or group of systems) from the MSC to be the Backup Master. The system must be either an unsecured system (which will be secured by being made a Backup Master), or a system that is not part of any ASG (client or server). These systems will mirror the MSC's security configuration.

The Backup Master has client access from the HBAnyware utility to all of the servers in the MSC's ACG. However, the Backup Master does not have client access to the MSC and it cannot modify the security configuration (create, modify or delete ASGs).

## No Backup Master and the MSC Is No Longer Available

### Situation:

I do not have a Backup Master and the MSC system is no longer available. The servers are still secure. I installed the HBAnyware Security Configurator on another system, but I cannot access those servers to remove the security from them.

### Resolution:

The servers are no longer part of a valid security configuration because there is no MSC to provide master control of the configuration. In order to reset the security on the affected servers, you will need to contact Emulex Technical Support to receive a special application and instructions on the reset procedure. After the servers have been reset, they should be seen by the HBAnyware Security Configurator and the HBAnyware utility. At this point, you can set up security again through another MSC. At this time, also create a Backup Master.



## The Backup Master Tab Is Not Available

### Situation:

The Backup Master tab is not available.

### Resolution:

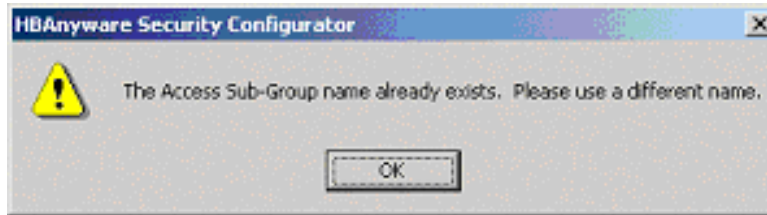
The Backup Master tab is displayed only when the HBAware Security Configurator is running on the MSC or a Backup Master. You use this tab to set up a system or systems to be backups to the MSC and to replace the MSC with a Backup Master.

Each time you start the HBAware Security Configurator on the MSC and there is no Backup Master assigned, a warning message urges you to assign at least one Backup Master to prevent the loss of security information if the MSC were to become disabled.

## Error Message Appears When Creating an ASG

### Situation:

The following error message appears when I create an ASG:



### Resolution:

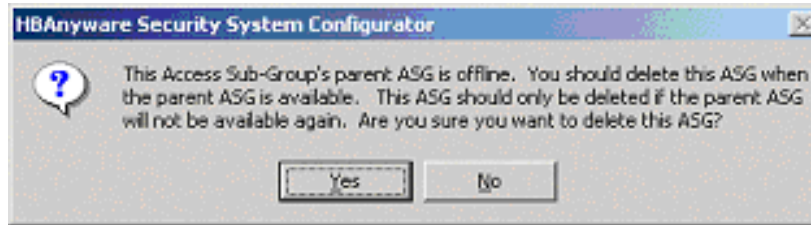
You entered a duplicate ASG name in the Access Sub-Group Name field. At each level of the security topology, each ASG name must be unique.

Click OK and enter a unique ASG name.

## Error Message Appears When Deleting an ASG

### Situation:

The following message appears when I delete an ASG:



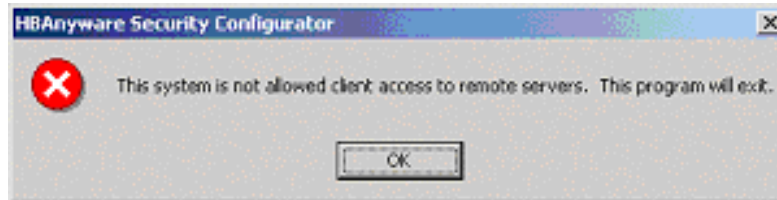
### Resolution:

The offline ASG entry serves as a placeholder for where the real ASG would be in the tree. You can neither modify nor delete it (although it is removed from the display if all of the child ASGs are deleted). It is possible to delete the child ASGs of the offline ASG. However, it is recommended that you delete them only if the client for the offline ASG will never be put online again. It is best to delete child ASGs when the parent ASG is online.

## Error Message Appears When Starting the HBAnyware Security Configurator

### Situation:

The following message appears when I start the Configurator:



### Resolution:

The system you are running the Configurator on is already under the security umbrella as a server to one or more clients.

To make this server a client (so that it can successfully run the Configurator), do the following:

1. Run the Configurator on the MSC or on any client that has this server in its ASG.
2. Make this server a client to a group of servers.

## Error Message States "No Backup Master Client Assigned"

### Situation:

The following error message appears when I start the Configurator:



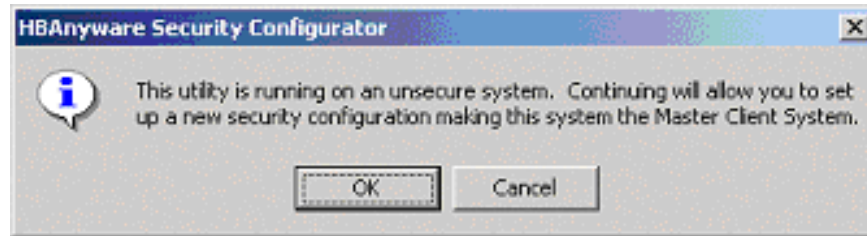
### Resolution:

Use the Backup Master tab to assign a Backup Master for the MSC.

## Error Message States "Utility is Running on an Unsecure System"

### Situation:

The first time the HBAnyware Security Configurator is started in an unsecure environment, the following message appears:



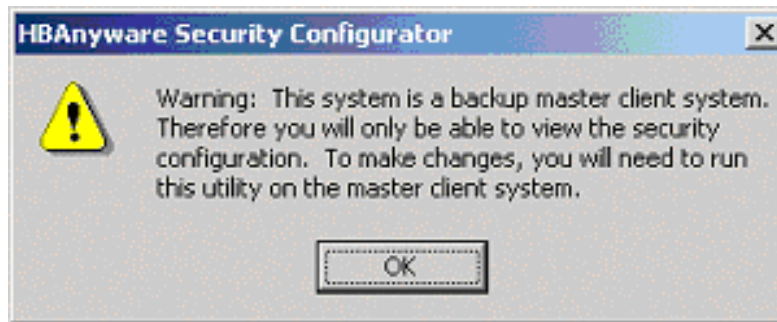
### Resolution:

Press OK and complete the ACG setup. The system on which the Configurator is running will become the MSC.

## Error Message States "System is a Backup Master Client System"

### Situation:

When I start the HBAnyware Security Configurator on a Backup Master system, the following message is displayed:



### Resolution:

Because each Backup Master system receives all the updates that the MSC makes to the security configuration, the Backup Master systems must be online when the HBAnyware Security Configurator is running on the MSC. Otherwise, updates to the security configuration are not reflected to the Backup Master. If the Backup Master becomes the MSC, corruption of the security configuration may occur.

## The MSC Is No Longer Bootable or Able to Connect to the FC Network

### Situation:

The MSC is no longer bootable or able to connect to the FC network.

### Resolution:

You must reassign a Backup Master as the new MSC from the Backup Master.

**Warning** Use this procedure only if the MSC cannot relinquish control to a Backup Master. For example, if the MSC is no longer bootable or able to connect to the FC network. Under any other circumstances, if the Backup Master takes over as the MSC and the MSC is still running or comes back online later, there will be two MSCs for the same security configuration. This will eventually lead to corruption of the security configuration.



## New Keys Were Generated While Servers Were Offline

### Situation:

A "Generate New Keys" operation was performed while one or more of the servers were offline. Now those servers can no longer access the HBAnyware Security Configurator or the HBAnyware utility.

### Resolution:

The servers are no longer part of the security configuration. In order to reset the security on the affected servers, you must contact Emulex Technical Support to receive a special application and instructions on the reset procedure. After the servers have been reset, they can be added back into the security topology by the MSC.

**Note** If the server was also a client to an ASG, then when you run the Configurator on the MSC or a parent client of this client, its label in the ASG tree of the Access Sub-Group tab will be "- ASG (Offline Client) -". You must delete the ASG (after deleting the child ASGs) and recreate the ASG configuration of this client and its child ASGs.

## Security Removed While Servers Were Offline

### **Situation:**

Security was removed while one or more servers were offline. I can no longer access those servers from the HBAnyware Security Configurator or the HBAnyware utility.

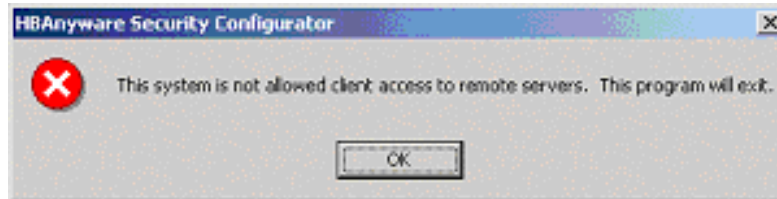
### **Resolution:**

The servers are no longer part of the security configuration. In order to reset the security on the affected servers, contact Emulex Technical Support to receive a special application and instructions on the reset procedure. After the servers have been reset, they should be seen by the HBAnyware Security Configurator or the HBAnyware utility.

## Cannot Run the Configurator on a System that Is Configured for Only Secure Access

### Situation:

I cannot run the HBAnyware Security Configurator on a system that is configured for only secure server access (it has no client privileges). The following message is displayed when the HBAnyware Security Configurator starts:



### Resolution:

You cannot run the HBAnyware Security Configurator on a system that is configured for only secure server access. Click OK and the Configurator stops.

## Introduction

Log messages are organized into logical groups based on code functionality within the Fibre Channel driver. Each group consists of a block of 100 log message numbers. Most groups require a single block of 100 message numbers, however some groups (INIT, FCP) require two blocks.

The groups and the associated number ranges are defined in the Message Log table below. The preamble string shown in the Message Log table is displayed as part of the log message. The lower case 'x' of the preamble string defines the severity of the log message. The 'x' will be replaced by one of five lower case letters. Those letters are defined in the Severity Code table.

## Severity Codes

Information and warning messages can be turned ON or OFF by setting/resetting the appropriate mask bit(s) in the variable 'lpfc\_log\_verbose' located in the driver configuration module, lpfc.conf.c. By default, both information and warning messages are disabled. Configuration error (c), error (e), and panic (p) messages can not be disabled.

**Severity Code Table**

Code	Severity
i	Information
w	Warning
c	Configuration error
e	Error
p	Panic

## Message Group Masks

The following table defines the log message groups and the associated number ranges.

- The preamble string shown in this table is displayed as part of the log message.
- The lower case 'x' of the preamble string defines the severity of the log message and represents one of five lower case letters defined in the severity codes table.

### Message Log Table

LOG Message Verbose Mask Definition	Preamble String	From	To	Verbose Bit	Verbose Description
LOG_ELS	ELx	0100	0199	0x1	ELS events
LOG_DISCOVERY	DIx	0200	0299	0x2	Link discovery events
LOG_MBOX	MBx	0300	0399	0x4	Mailbox events
LOG_INIT	INx	0400	0499	0x8	Initialization events
Future		0500	0599		
LOG_FCP	FPx	0700	0799	0x40	FCP traffic history
Future		0800	0899		
LOG_NODE	NDx	0900	0999	0x80	Node table events
Reserved		1000	1099	0x100	
LOG_TGTM	TMx	1100	1199	0x200	FCP Target Node events
LOG_MISC	MIx	1200	1299	0x400	Miscellaneous events
LOG_LINK_EVENT	LKx	1300	1399	0x10	Link events
LOG_SLI	SLx	1400	1499	0x800	SLI events
IOCTL_ERROR	IOx	1600	1699	0x2000	IOCTL events
LOG_ALL_MSG_				0x1fff	Log all messages

The following is an example of a LOG message:

```
Jul 12 16:30:26 <node> kernel: !lpfc0:0234:Dli:Device Discovery completes
```

In the above LOG message:

- lpfc0 identifies the LOG message as coming from EMULEX HBA0.

- 0234 identifies the LOG message number.
- Dli identifies the LOG message as a DISCOVERY (DI) INFORMATION (i) message.

**Note** If the word 'Data:' is present in a LOG message, any information to the right of 'Data:' is intended for Emulex technical support/engineering use only.

## ELS Events (0100 - 0199)

### **elx\_mes0100: FLOGI failure**

DESCRIPTION: An ELS FLOGI command that was sent to the fabric failed.

DATA: (1) ulpStatus (2) ulpWord[4]

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

### **elx\_mes0101: FLOGI completes successfully**

DESCRIPTION: An ELS FLOGI command that was sent to the fabric succeeded.

DATA: (1) ulpWord[4] (2) e\_d\_tov (3) r\_a\_tov (4) edtovResolution

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

**elx\_mes0102: PLOGI completes to NPort <nlp\_DID>**

DESCRIPTION: The HBA performed a PLOGI into a remote NPort.

DATA: (1) ulpStatus (2) ulpWord[4] (3) disc (4) num\_disc\_nodes

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

**elx\_mes0103: PRLI completes to NPort <nlp\_DID>**

DESCRIPTION: The HBA performed a PRLI into a remote NPort.

DATA: ((1) ulpStatus (2) ulpWord[4] (3) num\_disc\_nodes

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.



**elx\_mes0104: ADISC completes to NPort <nlp\_DID>**

DESCRIPTION: The HBA performed a ADISC into a remote NPort.

DATA: (1) ulpStatus (2) ulpWord[4] (3) disc (4) num\_disc\_nodes

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

**elx\_mes0105: LOGO completes to NPort <nlp\_DID>**

DESCRIPTION: The HBA performed a LOGO to a remote NPort.

DATA: (1) ulpStatus (2) ulpWord[4] (3) num\_disc\_nodes

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

**elx\_mes0106: ELS cmd tag <ulploTag> completes**

DESCRIPTION: The specific ELS command was completed by the firmware.

DATA: (1) ulpStatus (2) ulpWord[4]

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

**elx\_mes0107: Retry ELS command <elsCmd> to remote NPORT <did>**

DESCRIPTION: The driver is retrying the specific ELS command.

DATA: ((1) retry (2) delay

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

**elx\_mes0108: No retry ELS command <elsCmd> to remote NPORT <did>**

DESCRIPTION: The driver decided not to retry the specific ELS command that failed.

DATA: (1) retry (2) nlp\_flag

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

**elx\_mes0109: ACC to LOGO completes to NPort <nlp\_DID>**

DESCRIPTION: The driver received a LOGO from a remote NPort and successfully issued an ACC response.

DATA: (1) nlp\_flag (2) nlp\_state (3) nlp\_rpi

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

### **elx\_mes0110: ELS response tag <ulploTag> completes**

DESCRIPTION: The specific ELS response was completed by the firmware.

DATA: (1) ulpStatus (2) ulpWord[4] (3) nlp\_DID (4) nlp\_flag (5) nlp\_state (6) nle.  
nlp\_rpi

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

### **elx\_mes0111: Dropping received ELS cmd**

DESCRIPTION: The driver decided to drop an ELS Response ring entry.

DATA: (1) ulpStatus (2) ulpWord[4]

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver or firmware problem. If problems persist report these errors to Technical Support.

**elx\_mes0112: ELS command <elsCmd> received from NPORT <did>**

DESCRIPTION: Received the specific ELS command from a remote NPort.

DATA: (1) fc\_ffstate

SEVERITY: Information

LOG: LOG\_ELS verbose

MODULE: fcelsb.c

ACTION: No action needed, informational.

**elx\_mes0113: An FLOGI ELS command <elsCmd> was received from DID <did> in Loop Mode**

DESCRIPTION: While in Loop Mode an unknown or unsupported ELS command was received.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: Check device DID

**elx\_mes0114: PLOGI chkparm OK**

DESCRIPTION: Received a PLOGI from a remote NPORT and its Fibre Channel service parameters match this HBA. Request can be accepted.

DATA: (1) nlp\_DID (2) nlp\_state (3) nlp\_flag (4) nlp\_Rpi

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

**elx\_mes0115: Unknown ELS command <elsCmd> received from NPORT <did>**

DESCRIPTION: Received an unsupported ELS command from a remote NPORT.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: Check remote NPORT for potential problem.

**elx\_mes0116: Xmit ELS command <elsCmd> to remote NPORT <did>**

DESCRIPTION: Xmit ELS command to remote NPORT.

DATA: (1) icmd->ulploTag (2) binfo->fc\_ffstate

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

**elx\_mes0117: Xmit ELS response <elsCmd> to remote NPORT <did>**

DESCRIPTION: Xmit ELS response to remote NPORT.

DATA: (1) icmd->ulploTag (2) size

SEVERITY: Information

LOG: LOG\_ELS verbose

MODULE: fcelsb.c

ACTION: No action needed, informational.

**elx\_mes0118: Xmit CT response on exchange <xid>**

DESCRIPTION: Xmit a CT response on the appropriate exchange.

DATA: (1) ulploTag (2) fc\_ffstate

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

**elx\_mes0119: Issue GEN REQ IOCB for NPORT <did>**

DESCRIPTION: Issue a GEN REQ IOCB for remote NPORT. These are typically used for CT request.

DATA: (1) ulploTag (2) fc\_ffstate

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.



### **elx\_mes0120: PLOGI chkparm OK**

DESCRIPTION: Received a PLOGI from a remote NPORT and its Fibre Channel service parameters match this HBA. Request can be accepted.

DATA: (1) nlp\_DID (2) nlp\_state (3) nlp\_flag (4) nlp\_Rpi

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

### **elx\_mes0121: PLOGI chkparm OK**

DESCRIPTION: Received a PLOGI from a remote NPORT and its Fibre Channel service parameters match this HBA. Request can be accepted.

DATA: (1) nlp\_DID (2) nlp\_state (3) nlp\_flag (4) nlp\_Rpi

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

### **elx\_mes0122: PLOGI chkparm OK**

DESCRIPTION: Received a PLOGI from a remote NPORT and its Fibre Channel service parameters match this HBA. Request can be accepted.

DATA: (1) nlp\_DID (2) nlp\_state (3) nlp\_flag (4) nlp\_Rpi

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

### **elx\_mes0123: PLOGI chkparm OK**

DESCRIPTION: Received a PLOGI from a remote NPORT and its Fibre Channel service parameters match this HBA. Request can be accepted.

DATA: (1) nlp\_DID (2) nlp\_state (3) nlp\_flag (4) nlp\_Rpi

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

### **elx\_mes0124:PLOGI chkparm OK**

DESCRIPTION: Received a PLOGI from a remote NPORT and its Fibre Channel service parameters match this HBA. Request can be accepted.

DATA:(1) nlp\_DID (2) nlp\_state (3) nlp\_flag (4) nlp\_Rpi

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

### **elx\_mes0125: PLOGI chkparm OK**

DESCRIPTION: Received a PLOGI from a remote NPORT and its Fibre Channel service parameters match this HBA. Request can be accepted.

DATA: (1) nlp\_DID (2) nlp\_state (3) nlp\_flag (4) nlp\_Rpi

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

### **elx\_mes0126: PLOGI chkparm OK**

DESCRIPTION: Received a PLOGI from a remote NPORT and its Fibre Channel service parameters match this HBA. Request can be accepted.

DATA: (1) nlp\_DID (2) nlp\_state (3) nlp\_flag (4) nlp\_Rpi

SEVERITY: Information

LOG: LOG\_ELS verbose

ACTION: No action needed, informational.

### **elx\_mes0127: ELS timeout**

DESCRIPTION: An ELS IOCB command was posted to a ring and did not complete within ULP timeout seconds.

DATA: (1) elscmd (2) did (3) ulpcommand (4) iotag

SEVERITY: Error

LOG: Always

ACTION: If no ELS command is going through the adapter, reboot the system; If problem persists, contact Technical Support.

## Link Discovery Events (0200 - 0299)

### **elx\_mes0200: CONFIG\_LINK bad hba state <hba\_state>**

DESCRIPTION: A CONFIG\_LINK mbox command completed and the driver was not in the right state.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: Software driver error. If this problem persists, report these errors to Technical Support.

### **elx\_mes0201: Abort outstanding I/O on NPort <nlp\_DID>**

DESCRIPTION: All outstanding I/Os are cleaned up on the specified remote NPort.

DATA: (1) nlp\_flag (2) nlp\_state (3) nle.nlp\_rpi

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

**elx\_mes0202: Start Discovery hba state <hba\_state>**

DESCRIPTION: Device discovery / rediscovery after FLOGI, FAN or RSCN has started.

DATA: (1) tmo (2) fc\_plogi\_cnt (3) fc\_adisc\_cnt

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

**elx\_mes0203: Nodev timeout on NPort <nlp\_DID>**

DESCRIPTION: A remote NPort the was discovered by the driver disappeared for more than ELX\_NODEV\_TMO seconds.

DATA: (1) nlp\_flag (2) nlp\_state (3) nlp\_rpi

SEVERITY: Error

LOG: Always

ACTION: Check connections to Fabric / HUB or remote device.

### **elx\_mes0204: Create SCSI Target <tgt>**

DESCRIPTION: A mapped FCP target was discovered and the driver has allocated resources for it.

DATA: None

SEVERITY: Information

LOG: LOG\_DISCOVERY | LOG\_FCP verbose

ACTION: No action needed, informational.

### **elx\_mes0205: Create SCSI LUN <lun> on Target <tgt>**

DESCRIPTION: A LUN on a mapped FCP target was discovered and the driver has allocated resources for it.

DATA: None

SEVERITY: Information

LOG: LOG\_DISCOVERY | LOG\_FCP verbose

ACTION: No action needed, informational.

**elx\_mes0206: Report Lun completes on NPort <nlp\_DID>**

DESCRIPTION: The driver issued a REPORT\_LUN SCSI command to a FCP target and it completed.

DATA: (1) ulpStatus (2) rspStatus2 (3) rspStatus3 (4) nlp\_failMask

SEVERITY: Information

LOG: LOG\_DISCOVERY | LOG\_FCP verbose

ACTION: No action needed, informational.

**elx\_mes0207: Issue Report LUN on NPort <nlp\_DID>**

DESCRIPTION: The driver issued a REPORT\_LUN SCSI command to a FCP target.

DATA: (1) nlp\_failMask (2) nlp\_state (3) nlp\_rpi

SEVERITY:Information

LOG: LOG\_DISCOVERY | LOG\_FCP verbose

No action needed, informational.



**elx\_mes0208: Failmask change on NPort <nlp\_DID>**

DESCRIPTION: An event was processed that indicates the driver may not be able to communicate with the remote NPort.

DATA: (1) nlp\_failMask (2) bitmask (3) flag

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

**elx\_mes0209: RFT request completes ulpStatus <ulpStatus> CmdRsp <CmdRsp>**

DESCRIPTION: A RFT request that was sent to the fabric completed.

DATA: (1) nlp\_failMask (2) bitmask (3) flag

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

**elx\_mes0210: Continue discovery with <num\_disc\_nodes> ADISCs to go**

DESCRIPTION: A device discovery is in progress.

DATA: (1) fc\_adisc\_cnt (2) fc\_flag (3) phba->hba\_state

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

**elx\_mes0211: DSM in event <evt> on NPort <nlp\_DID> in state <cur\_state>**

DESCRIPTION: The driver Discovery State Machine is processing an event.

DATA: (1) nlp\_flag

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

**elx\_mes0212: DSM out state <rc> on NPort <nlp\_DID>**

DESCRIPTION: The driver Discovery State Machine completed processing an event.

DATA: (1) nlp\_flag

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

**0elx\_mes0213: Reassign scsi id <sid> to NPort <nlp\_DID>**

DESCRIPTION: A previously bound FCP Target has been rediscovered and reassigned a scsi id.

DATA: (1) nlp\_bind\_type (2) nlp\_flag (3) nlp\_state (4) nlp\_rpi

SEVERITY: Information

LOG: LOG\_DISCOVERY | LOG\_FCP verbose

ACTION: No action needed, informational.

### **elx\_mes0214: RSCN received**

DESCRIPTION: An RSCN ELS command was received from a fabric.

DATA: (1) fc\_flag (2) i (3) \*lp (4) fc\_rscn\_id\_cnt

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

### **elx\_mes0215: RSCN received**

DESCRIPTION: An RSCN ELS command was received from a fabric and processed.

DATA: (1) fc\_flag (2) cnt (3) fc\_rscn\_id\_cnt (4) fc\_ffstate

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

**elx\_mes0216: Assign scandown scsi id <sid> to NPort <nlp\_DID>**

DESCRIPTION: A scsi id is assigned due to BIND\_ALPA.

DATA: ((1) nlp\_bind\_type (2) nlp\_flag (3) nlp\_state (4) nlp\_rpi

SEVERITY: Information

LOG: LOG\_DISCOVERY | LOG\_FCP verbose

ACTION: No action needed, informational.

**elx\_mes0217: Unknown Identifier in RSCN payload**

DESCRIPTION: Typically the identifier in the RSCN payload specifies a domain, area or a specific NportID. If neither of these are specified, a warning will be recorded.

DATA: (1) didp->un.word

SEVERITY: Error

LOG: Always

ACTION: Potential problem with Fabric. Check with Fabric vendor.

### **elx\_mes0218: FDMI Request**

DESCRIPTION: The driver is sending an FDMI request to the fabric.

DATA: (1) fc\_flag (2) hba\_state (3) cmdcode

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

### **elx\_mes0219: Issue FDMI request failed**

DESCRIPTION: Cannot issue FDMI request to HBA.

DATA: (1) cmdcode

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

### **elx\_mes0220: FDMI rsp failed**

DESCRIPTION: An error response was received to FDMI request.

DATA:(1) SWAP\_DATA16(fdmi\_cmd)

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: The fabric does not support FDMI, check fabric configuration.

### **elx\_mes0221: FAN timeout**

DESCRIPTION: A link up event was received without the login bit set, so the driver waits E\_D\_TOV for the Fabric to send a FAN. If no FAN is received, a FLOGI will be sent after the timeout.

DATA: None

SEVERITY: Warning

LOG: LOG\_DISCOVERY verbose

ACTION: None required. The driver recovers from this condition by issuing a FLOGI to the fabric.

### **elx\_mes0222: Initial FLOGI timeout**

DESCRIPTION: The driver sent the initial FLOGI to fabric and never got a response back.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: Check Fabric configuration. The driver recovers from this and continues with device discovery.

### **elx\_mes0223: Timeout while waiting for NameServer login**

DESCRIPTION: Our login request to the NameServer was not acknowledged within RATO.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: Check the fabric configuration. The driver recovers from this and continues with device discovery.



### **elx\_mes0224: NameServer Query timeout**

DESCRIPTION: Node authentication timeout, node Discovery timeout. A NameServer Query to the Fabric or discovery of reported remote NPorts is not acknowledged within R\_A\_TOV.

DATA: (1) fc\_ns\_retry (2) fc\_max\_ns\_retry

SEVERITY: Error

LOG: Always

ACTION: Check Fabric configuration. The driver recovers from this and continues with device discovery.

### **elx\_mes0225: Device Discovery completes**

DESCRIPTION: This indicates successful completion of device (re)discovery after a link up.

DATA: None

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

### **elx\_mes0226: Device discovery completion error**

DESCRIPTION: This indicates that an uncorrectable error was encountered during device (re)discovery after a link up. Fibre Channel devices will not be accessible if this message is displayed.

DATA: None

SEVERITY: Error

LOG: Always

MODULE: fcscsib.c

ACTION: Reboot the system. If the problem persists, report the error to Technical Support. Run with verbose mode on for more details.

### **elx\_mes0227: Node Authentication timeout**

DESCRIPTION: The driver has lost track of what NPORTs are being authenticated.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: None required. The driver should recover from this event.

**elx\_mes0228: CLEAR LA timeout**

DESCRIPTION: The driver issued a CLEAR\_LA that never completed.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: None required. The driver should recover from this event.

**elx\_mes0229: Assign scsi ID <sid> to NPort <nlp\_DID>**

DESCRIPTION: The driver assigned a scsi id to a discovered mapped FCP target.

DATA: (1) nlp\_bind\_type (2) nlp\_flag (3) nlp\_state (4) nlp\_rpi

SEVERITY: Information

LOG: LOG\_DISCOVERY | LOG\_FCP verbose

ACTION: No action needed, informational.

**elx\_mes0230: Cannot assign scsi ID on NPort <nlp\_DID>**

DESCRIPTION: The driver cannot assign a scsi id to a discovered mapped FCP target.

DATA: (1) nlp\_flag (2) nlp\_state (3) nlp\_rpi

SEVERITY: Information

LOG: LOG\_DISCOVERY | LOG\_FCP verbose

ACTION: Check persistent binding information.

**elx\_mes0231: RSCN timeout**

DESCRIPTION: The driver has lost track of what NPORTs have RSCNs pending.

DATA: (1) fc\_ns\_retry (2) fc\_max\_ns\_retry

SEVERITY: Error

LOG: Always

ACTION: None required. The driver should recover from this event.

**elx\_mes0232: Continue discovery with <num\_disc\_nodes> PLOGIs to go**

DESCRIPTION: Device discovery is in progress.

DATA: (1) fc\_plogi\_cnt (2) fc\_flag (3) phba->hba\_state

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

**elx\_mes0234: ReDiscovery RSCN**

DESCRIPTION: The number / type of RSCNs has forced the driver to go to the nameserver and re-discover all NPORTs.

DATA: (1) fc\_defer\_rscn.q\_cnt (2) fc\_flag (3) hba\_state

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

### **elx\_mes0235: Deferred RSCN**

DESCRIPTION: The driver has received multiple RSCNs and has deferred the processing of the most recent RSCN.

DATA: (1) fc\_defer\_rscn.q\_cnt (2) fc\_flag (3) hba\_state

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

### **elx\_mes0236: NameServer req**

DESCRIPTION: The driver is issuing a NameServer request to the fabric.

DATA: (1) cmdcode (2) fc\_flag (3) fc\_rscn\_id\_cnt

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

### **elx\_mes0237: Pending Link Event during Discovery**

DESCRIPTION: Received link event during discovery. Causes discovery restart.

DATA: (1) hba\_state (2) ulploTag (3) ulpStatus (4) ulpWord[4]

SEVERITY: Warning

LOG: LOG\_DISCOVERY verbose

ACTION: None required unless problem persist. If persistent check cabling.

### **elx\_mes0238: NameServer Rsp**

DESCRIPTION: The driver received a NameServer response.

DATA: (1) Did (2) nlp\_flag (3) fc\_flag (4) fc\_rscn\_id\_cnt

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

### **elx\_mes0239: NameServer Rsp**

DESCRIPTION: The driver received a NameServer response.

DATA: (1) Did (2) ndlp (3) fc\_flag (4) fc\_rscn\_id\_cnt

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

### **elx\_mes0240: NameServer Rsp Error**

DESCRIPTION: The driver received a NameServer response containing a status error.

DATA: (1) CommandResponse.bits.CmdRsp (2) ReasonCode  
(3) Explanation (4) fc\_flag

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: Check the fabric configuration. The driver recovers from this and continues with device discovery.



### **elx\_mes0241: NameServer rsp error**

DESCRIPTION: The driver received a NameServer response containing a status error.

DATA: (1) CommandResponse.bits.CmdRsp (2) ReasonCode  
(3) Explanation (4) fc\_flag

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: Check the fabric configuration. The driver recovers from this and continues with device discovery.

### **elx\_mes0243: Issue FDMI request failed**

DESCRIPTION: Cannot issue an FDMI request to HBA.

DATA: (1) cmdcode

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

**elx\_mes0244: Issue FDMI request failed**

DESCRIPTION: Cannot issue an FDMI request to the HBA.

DATA: (1) cmdcode

SEVERITY: Information

LOG: LOG\_Discovery verbose

ACTION: No action needed, informational.

**elx\_mes0245: ALPA based bind method used on an HBA which is in a nonloop topology**

DESCRIPTION: ALPA based bind method used on an HBA which is not in a loop topology.

DATA: (1) topology

SEVERITY: Warning

LOG: LOG\_DISCOVERY verbose

ACTION: Change the bind method configuration parameter of the HBA to 1 (WWNN) or 2(WWPN) or 3(DID)

**elx\_mes0246: RegLogin failed**

DESCRIPTION: The firmware returned a failure for the specified RegLogin.

DATA: Did, mbxStatus, hbaState

SEVERITY: Error

LOG: Always

MODULE: fcscsib.c

ACTION: This message indicates that the firmware could not do RegLogin for the specified Did. There may be a limitation on how many nodes an HBA can see.

**elx\_mes0247: Start Discovery Timer state <hba\_state>**

DESCRIPTION: Start the device discovery / RSCN rescue timer.

DATA: (1) tmo (2) disctmo (3) fc\_plogi\_cnt (4) fc\_adisc\_cnt

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

**elx\_mes0248: Cancel Discovery Timer state <hba\_state>**

DESCRIPTION: Cancel the device discovery / RSCN rescue timer.

DATA: (1) fc\_flag (2) rc (3) fc\_plogi\_cnt (4) fc\_adisc\_cnt

SEVERITY: Information

LOG: LOG\_DISCOVERY verbose

ACTION: No action needed, informational.

## Mailbox Events (0300 - 0399)

### **elx\_mes0300: READ\_LA: no buffers**

DESCRIPTION: The driver attempted to issue a READ\_LA mailbox command to the HBA, but there were no buffers available.

DATA: None

SEVERITY: Warning

LOG: LOG\_MBOX verbose

ACTION: This message indicates: (1) a possible lack of memory resources. Try increasing the lpfc 'num\_bufs' configuration parameter to allocate more buffers. (2) A possible driver buffer management problem. If this problem persists, report the error to Technical Support.

### **elx\_mes0301: READ\_SPARAM: no buffers**

DESCRIPTION: The driver attempted to issue a READ\_SPARAM mailbox command to the HBA, but there were no buffers available.

DATA: None

SEVERITY: Warning

LOG: LOG\_MBOX verbose

ACTION: This message indicates: (1) a possible lack of memory resources. Try increasing the lpfc 'num\_bufs' configuration parameter to allocate more buffers. (2) A possible driver buffer management problem. If the problem persists, report the error to Technical Support.

**elx\_mes0302: REG\_LOGIN: no buffers**

DESCRIPTION: The driver attempted to issue a REG\_LOGIN mailbox command to the HBA, but there were no buffers available.

DATA: None

SEVERITY: Warning

LOG: LOG\_MBOX verbose

ACTION: This message indicates: (1) a possible lack of memory resources. Try increasing the lpfc 'num\_bufs' configuration parameter to allocate more buffers. (2) A possible driver buffer management problem. If the problem persists, report the error to Technical Support.

**elx\_mes0304: Stray mailbox interrupt, mbxCommand <cmd> mbxStatus <status>**

DESCRIPTION: Received a mailbox completion interrupt and there are no outstanding mailbox commands.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

### **elx\_mes0305: Mbox cmd cmpl error - RETRYing**

DESCRIPTION: A mailbox command completed with an error status that causes the driver to reissue the mailbox command.

DATA: (1) mbxCommand (2) mbxStatus (3) word1 (4) hba\_state

SEVERITY: Information

LOG: LOG\_MBOX verbose

ACTION: No action needed, informational.

### **elx\_mes0306: CONFIG\_LINK mbxStatus error <mbxStatus> HBA state <hba\_state>**

DESCRIPTION: The driver issued a CONFIG\_LINK mbox command to the HBA that failed.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a firmware or hardware problem. Report these errors to Technical Support.

**elx\_mes0307: Mailbox Cmpl, wd0 <pmbox> wd1 <varWord> wd2 <varWord> cmpl <mbox\_cmpl>**

DESCRIPTION: A mailbox command completed.

DATA: None

SEVERITY: Information

LOG: LOG\_MBOX verbose

ACTION: No action needed, informational.

**elx\_mes0308: Mbox cmd issue - BUSY**

DESCRIPTION: The driver attempted to issue a mailbox command while the mailbox was busy processing the previous command. The processing of the new command will be deferred until the mailbox becomes available.

DATA: (1) mbxCommand (2) hba\_state (3) sli\_flag (4) flag

SEVERITY: Information

LOG: LOG\_MBOX verbose

ACTION: No action needed, informational.



**elx\_mes0309: Mailbox cmd <cmd> issue**

DESCRIPTION: The driver is in the process of issuing a mailbox command.

DATA: (1) hba\_state (2) sli\_flag (3) flag

SEVERITY: Information

LOG: LOG\_MBOX verbose

ACTION: No action needed, informational.

**elx\_mes0310: Mailbox command <cmd> timeout**

DESCRIPTION: A mailbox command was posted to the adapter and did not complete within 30 seconds.

DATA: (1) hba\_state (2) sli\_flag (3) mbox\_active

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver or firmware problem. If no I/O is going through the adapter, reboot the system. If the problem persists, report the error to Technical Support.

**elx\_mes0311: Mailbox command <cmd> cannot issue**

DESCRIPTION: The driver is in the wrong state to issue the specified command.

DATA: (1) hba\_state (2) sli\_flag (3) flag

SEVERITY: Information

LOG: LOG\_MBOX verbose

MODULE: fcscsib.c

ACTION: No action needed, informational.

**elx\_mes0312: Ring <ringno> handler: portRspPut <portRspPut> is bigger then rsp ring <portRspMax>**

DESCRIPTION: The port rsp ring put index is larger than the size of the rsp ring.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

**elx\_mes0313: Ring <ringno> handler: unexpected Rctl <Rctl> Type <Type> received**

DESCRIPTION: The Rctl/Type of a received frame did not match any for the configured masks for the specified ring.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

**elx\_mes0314: Ring <ringno> issue: portCmdGet <portCmdGet> is bigger than cmd ring <portCmdMax>**

DESCRIPTION: The port cmd ring get index is greater than the size of cmd ring.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

**elx\_mes0315: Ring <ringno> issue: portCmdGet <portCmdGet> is bigger then cmd ring <portCmdMax>**

DESCRIPTION: The port cmd ring get index is greater than the size of cmd ring.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

**elx\_mes0316: Cmd ring <ringno> put: iotag <iotag> greater then configured max <fast\_iotag> wd0 <icmd>**

DESCRIPTION: The assigned I/O iotag is greater than the allowed maximum.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

**elx\_mes0317: Rsp ring <ringno> get: iotag <iotag> greater then configured max <fast\_iotag> wd0 <irsp>**

DESCRIPTION: The assigned I/O iotag is greater than the maximum allowed.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

**elx\_mes0318: Outstanding I/O count for ring <ringno> is at max <fast\_iotag>**

DESCRIPTION: An I/O tag cannot be assigned because none are available. The maximum number of allowed I/Os are currently outstanding.

DATA: None

SEVERITY: Information

LOG:LOG\_SLI verbose

ACTION: This message indicates the adapter HBA I/O queue is full. Typically this happens when heavy I/O is running on a low-end (3 digit) adapter. We suggest you upgrade to a higher-end adapter.

**elx\_mes0319: The driver issued a READ\_SPARAM mbox command to the HBA that failed.**

DESCRIPTION: The driver issued a READ\_SPARAM mbox command to the HBA that failed.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a firmware or hardware problem. Report these errors to Technical Support.

**elx\_mes0320: CLEAR\_LA mbxStatus error <mbxStatus> hba state <hba\_state>**

DESCRIPTION: The driver issued a CLEAR\_LA mbox command to the HBA that failed.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a firmware or hardware problem. Report these errors to Technical Support.

### **elx\_mes0321: Unknown IOCB command**

DESCRIPTION: Received an unknown IOCB command completion.

DATA: (1) ulpCommand (2) ulpStatus (3) ulploTag (4) ulpContext)

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver or firmware problem. If these problems persist, report these errors to Technical Support.

### **elx\_mes0322: Ring <ringno> handler: unexpected completion loTag <loTag>**

DESCRIPTION: The driver could not find a matching command for the completion received on the specified ring.

DATA: (1) ulpStatus (2) ulpWord[4] (3) ulpCommand (4) ulpContext

SEVERITY: Warning

LOG: LOG\_SLI verbose

ACTION: This error could indicate a software driver or firmware problem. If problems persist report these errors to Technical Support.

**elx\_mes0323: Unknown Mailbox command <cmd> Cmpl**

DESCRIPTION: A unknown mailbox command completed.

DATA: (1) Mailbox Command

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.

**elx\_mes0324: Adapter initialization error, mbxCmd <cmd> READ\_NVPARM, mbxStatus <status>**

DESCRIPTION: A read nvparams mailbox command failed during port configuration.

DATA:(1) Mailbox Command (2) Mailbox Command Status

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver, firmware or hardware problem. Report these errors to Technical Support.



## Initialization Events (0400 - 0499)

**elx\_mes400: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

MODULE: N/A

ACTION: N/A

**elx\_mes401: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

MODULE: N/A

ACTION: N/A

**elx\_mes402: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

MODULE: N/A

ACTION: N/A

**elx\_mes403: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

MODULE: N/A

ACTION: N/A

**elx\_mes404: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

MODULE: N/A

ACTION: N/A

**elx\_mes0405: Service Level Interface (SLI) 2 selected**

DESCRIPTION: A CONFIG\_PORT (SLI2) mailbox command was issued.

DATA: None

SEVERITY: Information

LOG: LOG\_INIT verbose

ACTION: No action needed, informational.

**elx\_mes0406: Memory buffer pool is below low water mark**

DESCRIPTION: A driver memory buffer pool is low on buffers.

DATA: (1) seg (2) fc\_lowmem (3) low

SEVERITY: Warning

LOG: LOG\_INIT verbose

ACTION: None required. The driver will recover as buffers are returned to the pool.

**elx\_mes0407: Memory Buffer Pool is at upper limit.**

DESCRIPTION: A memory buffer pool cannot add more buffers because it is at its himem value.

DATA: (1) seg (2) q\_cnt (3) himem

SEVERITY: Error

LOG: Always

ACTION: None required. The driver will recover as buffers are returned to the pool.

**elx\_mes0408: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0409: Memory Buffer Pool is out of buffers**

DESCRIPTION: A driver memory buffer pool is exhausted.

DATA: (1) seg (2) fc\_free (3) fc\_mbox.q\_cnt (4) fc\_memhi

SEVERITY: Error

LOG: Always

ACTION: Configure more resources for that buffer pool. If the problem persists, report the error to Technical Support.

**elx\_mes0410: Cannot find virtual addr for mapped buf on ring <num>**

DESCRIPTION: The driver cannot find the specified buffer in its mapping table. Thus it cannot find the virtual address needed to access the data.

DATA: (1) first (2) q\_first (3) q\_last (4) q\_cnt

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver or firmware problem. If problems persist report these errors to Technical Support.

**elx\_mes0411: fcp\_bind\_method is 4 with Persistent binding - ignoring fcp\_bind\_method**

DESCRIPTION: The configuration parameter for fcp\_bind\_method conflicts with Persistent binding parameter.

DATA: (1) a\_current (2) fcp\_mapping

SEVERITY: Error config

LOG: Always

ACTION: Make necessary changes to the lpfc configuration file.

**elx\_mes0412: Scan-down is out of range - ignoring scan-down**

DESCRIPTION: The configuration parameter for scan-down is out of range.

DATA: (1) clp[CFG\_SCAN\_DOWN].a\_current (2) fcp\_mapping

SEVERITY: Error

LOG: Always

ACTION: Make necessary changes to the lpfc configuration file.

**elx\_mes0413: Configuration parameter out of range, resetting to default value**

DESCRIPTION: User is attempting to set a configuration parameter to a value not supported by the driver. Resetting the configuration parameter to the default value.

DATA: (1) a\_string (2) a\_low (3) a\_hi (4) a\_default

SEVERITY: Error config

LOG: Always

ACTION: Make necessary changes to the lpfc configuration file.

**elx\_mes0414: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A



**elx\_mes0415: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: always

ACTION: N/A

**elx\_mes0416: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0417: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

MODULE: N/A

ACTION: N/A

**elx\_mes0418: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0419: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0420: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0421: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0422: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0423: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

MODULE: N/A

ACTION: N/A

**elx\_mes0424: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0425: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0426: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0427: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0428: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0429: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

MODULE: N/A

ACTION: N/A



**elx\_mes0430: WWPN binding entry <num>: syntax error code <code>**

DESCRIPTION: A syntax error occurred while parsing WWPN binding configuration information.

DATA: None

Detail: Binding syntax error codes

- 0 FC\_SYNTAX\_OK
- 1 FC\_SYNTAX\_OK\_BUT\_NOT\_THIS\_BRD
- 2 FC\_SYNTAX\_ERR\_ASC\_CONVERT
- 3 FC\_SYNTAX\_ERR\_EXP\_COLON
- 4 FC\_SYNTAX\_ERR\_EXP\_LPFC
- 5 FC\_SYNTAX\_ERR\_INV\_LPFC\_NUM
- 6 FC\_SYNTAX\_ERR\_EXP\_T
- 7 FC\_SYNTAX\_ERR\_INV\_TARGET\_NUM
- 8 FC\_SYNTAX\_ERR\_EXP\_D
- 9 FC\_SYNTAX\_ERR\_INV\_DEVICE\_NUM
- 10 FC\_SYNTAX\_ERR\_INV\_RRATIO\_NUM
- 11 FC\_SYNTAX\_ERR\_EXP\_NULL\_TERM

SEVERITY: Error config

LOG: Always

ACTION: Make necessary changes to the lpfc configuration file.

**elx\_mes0431: WWNN binding entry <num>: syntax error code <code>**

DESCRIPTION: A syntax error occurred while parsing WWNN binding configuration information.

DATA: None

Detail: Binding syntax error codes

- 0 FC\_SYNTAX\_OK
- 1 FC\_SYNTAX\_OK\_BUT\_NOT\_THIS\_BRD
- 2 FC\_SYNTAX\_ERR\_ASC\_CONVERT
- 3 FC\_SYNTAX\_ERR\_EXP\_COLON
- 4 FC\_SYNTAX\_ERR\_EXP\_LPFC
- 5 FC\_SYNTAX\_ERR\_INV\_LPFC\_NUM
- 6 FC\_SYNTAX\_ERR\_EXP\_T
- 7 FC\_SYNTAX\_ERR\_INV\_TARGET\_NUM
- 8 FC\_SYNTAX\_ERR\_EXP\_D
- 9 FC\_SYNTAX\_ERR\_INV\_DEVICE\_NUM
- 10 FC\_SYNTAX\_ERR\_INV\_RRATIO\_NUM
- 11 FC\_SYNTAX\_ERR\_EXP\_NULL\_TERM

SEVERITY: Error config

LOG: always

ACTION: Make necessary changes to the lpfc configuration file.

**elx\_mes0432: WWPN binding entry: node table full**

DESCRIPTION: More bindings entries were configured than the driver can handle.

DATA: None

SEVERITY: Error config

LOG: Always

ACTION: Make necessary changes to the lpfc configuration file so that fewer bindings are configured.

**elx\_mes0433: WWNN binding entry: node table full**

DESCRIPTION: More bindings entries were configured than the driver can handle.

DATA: None

SEVERITY: Error config

LOG: Always

ACTION: Make necessary changes to the lpfc configuration file so that fewer bindings are configured.

**elx\_mes0434: DID binding entry <num>: syntax error code <code>**

DESCRIPTION: A syntax error occurred while parsing DID binding configuration information.

DATA: None

Detail: Binding syntax error codes

- 0 FC\_SYNTAX\_OK
- 1 FC\_SYNTAX\_OK\_BUT\_NOT\_THIS\_BRD
- 2 FC\_SYNTAX\_ERR\_ASC\_CONVERT
- 3 FC\_SYNTAX\_ERR\_EXP\_COLON
- 4 FC\_SYNTAX\_ERR\_EXP\_LPFC
- 5 FC\_SYNTAX\_ERR\_INV\_LPFC\_NUM
- 6 FC\_SYNTAX\_ERR\_EXP\_T
- 7 FC\_SYNTAX\_ERR\_INV\_TARGET\_NUM
- 8 FC\_SYNTAX\_ERR\_EXP\_D
- 9 FC\_SYNTAX\_ERR\_INV\_DEVICE\_NUM
- 10 FC\_SYNTAX\_ERR\_INV\_RRATIO\_NUM
- 11 FC\_SYNTAX\_ERR\_EXP\_NULL\_TERM

SEVERITY: Error config

LOG: Always

ACTION: Make necessary changes to the lpfc configuration file.

**elx\_mes0435: DID binding entry: node table full**

DESCRIPTION: More bindings entries were configured than the driver can handle.

DATA: None

SEVERITY: Error config

LOG: Always

ACTION: Make necessary changes to the lpfc configuration file so that fewer bindings are configured.

**elx\_mes0436: Adapter failed to init, timeout, status reg <status>**

DESCRIPTION: The adapter failed during powerup diagnostics after it was reset .

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

**elx\_mes0437: Adapter failed to init, chipset, status reg <status>**

DESCRIPTION: The adapter failed during powerup diagnostics after it was reset.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

**elx\_mes0438: Adapter failed to init, chipset, status reg <status>**

DESCRIPTION: The adapter failed during powerup diagnostics after it was reset.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

**elx\_mes0439: Adapter failed to init, mbxCmd <cmd> READ\_REV, mbxStatus <status>**

DESCRIPTION: Adapter initialization failed when issuing a READ\_REV mailbox command.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

**elx\_mes0440: Adapter failed to init, mbxCmd <cmd> READ\_REV, detected outdated firmware**

DESCRIPTION: Outdated firmware was detected during initialization.

DATA: (1) read\_rev\_reset

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or firmware problem. Update the firmware. If the problem persists, report the error to Technical Support.

**elx\_mes0441: VPD not present on adapter, mbxCmd <cmd> DUMP VPD, mbxStatus <status>**

DESCRIPTION: The DUMP\_VPD mailbox command failed.

DATA: None

SEVERITY: Information

LOG: LOG\_INIT verbose

ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

**elx\_mes0442: Adapter failed to init, mbxCmd <cmd> CONFIG\_PORT, mbxStatus <status>**

DESCRIPTION: Adapter initialization failed when issuing a CONFIG\_PORT mailbox command.

DATA: (1) hbainit

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.



**elx\_mes0443: N/A**

DESCRIPTION: N/A

DATA: (1) N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0444: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0445: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: error

LOG: N/A

ACTION: N/A

**elx\_mes0446: Adapter failed to init, mbxCmd <cmd> CFG\_RING, mbxStatus <status>, ring <num>**

DESCRIPTION: Adapter initialization failed when issuing a CFG\_RING mailbox command.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

**elx\_mes0447: Adapter failed init, mbxCmd <cmd> CONFIG\_LINK mbxStatus <status>**

DESCRIPTION: Adapter initialization failed when issuing a CONFIG\_LINK mailbox command.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

**elx\_mes0448: Adapter failed to init, mbxCmd <cmd> READ\_SPARM, mbxStatus <status>**

DESCRIPTION: Adapter initialization failed when issuing a READ\_SPARM mailbox command.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

**elx\_mes0449: WorldWide PortName type <type> doesn't conform to IP Profile**

DESCRIPTION: In order to run IP, the WorldWide PortName must be of type IEEE (NAA = 1). This message is displayed if the adapter WWPN doesn't conform with the standard.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: Turn off the network-on configuration parameter or configure a different WWPN.

**elx\_mes0450: Adapter failed to init, mbxCmd <cmd> FARP, mbxStatus <status>**

DESCRIPTION: Adapter initialization failed when issuing a FARP mailbox command.

DATA: None

SEVERITY: Warning

LOG: LOG\_INIT verbose

ACTION: None required.

**elx\_mes0451: Enable interrupt handler failed**

DESCRIPTION: The driver attempted to register the HBA interrupt service routine with the host operating system, but failed.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or driver problem. If the problem persists, report the error to Technical Support.

**elx\_mes0451: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0453: Adapter failed to init, mbxCmd <cmd> READ\_CONFIG, mbxStatus <status>**

DESCRIPTION: Adapter initialization failed when issuing a READ\_CONFIG mailbox command.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

**elx\_mes0454: Adapter failed to init, mbxCmd <cmd> INIT\_LINK, mbxStatus <status>**

DESCRIPTION: Adapter initialization failed when issuing an INIT\_LINK mailbox command.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

**elx\_mes0455: Vital Product**

DESCRIPTION: Vital product data (VPD) contained in the HBA flash.

DATA: (1) vpd[0] (2) vpd[1] (3) vpd[2] (4) vpd[3]

SEVERITY: Information

LOG: LOG\_INIT verbose

ACTION: No action needed, informational.

**elx\_mes0456: N/A**

DESCRIPTION: N/A

Data: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

### **elx\_mes0457: Adapter Hardware Error**

DESCRIPTION: The driver received an interrupt indicting a possible hardware problem.

Data: (1) status (2) status1 (3) status2

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a hardware or firmware problem. If the problem persists, report the error to Technical Support.

### **elx\_mes0458: Bring adapter online**

DESCRIPTION: The FC driver has received a request to bring the adapter online. This may occur when running lputil.

DATA: None

SEVERITY: Warning

LOG: LOG\_INIT verbose

ACTION: None required.



**elx\_mes0459: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0460: Bring adapter offline**

DESCRIPTION: The FC driver has received a request to bring the adapter offline. This may occur when running lputil.

DATA: None

SEVERITY: Warning

LOG: LOG\_INIT verbose

ACTION: None required.

**elx\_mes0461: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0462: Too many cmd / rsp ring entries in SLI2 SLIM**

DESCRIPTION: The configuration parameter for Scan-down is out of range.

DATA: (1) totiocb (2) MAX\_SLI2\_IOCB

SEVERITY: Error

LOG: Always

ACTION: This is a software driver error. If this problem persists, report these errors to Technical Support.

## FCP Traffic History (0700 - 0799)

### **elx\_mes0700: Start nodev timer**

DESCRIPTION: A target disappeared from the Fibre Channel network. If the target does not return within nodev-tmo timeout, all I/O to the target will fail.

DATA: (1) nlp (2) nlp\_flag (3) nlp\_state (4) nlp\_DID

SEVERITY: Information

LOG: LOG\_FCP verbose

ACTION: None required.

### **elx\_mes071: Issue Abort Task Set to TGT <num> LUN <num>**

DESCRIPTION: TThe SCSI layer detected that it needs to abort all I/O to a specific device. This causes the FCP Task Management command to abort the I/O in progress.

DATA: (1) rpi (2) flags

SEVERITY: Information

LOG: LOG\_FCP verbose

ACTION: Check the state of the device in question.

### **elx\_mes0702: Issue Target Reset to TGT <num>**

DESCRIPTION: The SCSI layer detected that it needs to abort all I/O to a specific target. This results in an FCP Task Management command to abort the I/O in progress.

DATA: (1) rpi (2) flags

SEVERITY: Information

LOG: LOG\_FCP verbose

ACTION: Check the state of the target in question.

### **elx\_mes0703: Issue LUN Reset to TGT <num> LUN <num>**

DESCRIPTION: The SCSI layer detected that it must abort all I/O to a specific device. This results in an FCP Task Management command to abort the I/O in progress.

DATA: (1) rpi (2) flags

SEVERITY: Information

LOG: LOG\_FCP verbose

ACTION: Check the state of the device in question.

**elx\_mes0706: Start nodev timer**

DESCRIPTION: A target disappeared from the Fibre Channel network. If the target does not return within nodev-tmo timeout all I/O to the target will fail.

DATA: (1) nlp\_DID (2) nlp\_flag (3) nlp\_state (4) nlp

SEVERITY: Information

LOG: LOG\_FCP verbose

ACTION: No action needed, informational.

**elx\_mes0710: Iodone <target>/<lun> error <result> SNS <lp> <lp3>**

DESCRIPTION: This error indicates that the Fibre Channel driver is returning a SCSI command to the SCSI layer in error or with sense data.

DATA: (1) retry (2) resid

SEVERITY: Information

LOG: LOG\_FCP verbose

ACTION: None required.

### **elx\_mes0712: SCSI layer issued abort device**

DESCRIPTION: The SCSI layer is requesting the driver to abort I/O to a specific device.

DATA: (1) target (2) lun (3)

SEVERITY: Error

LOG: Always

ACTION: Check the state of the device in question.

### **elx\_mes0713: SCSI layer issued target reset**

DESCRIPTION: The SCSI layer is requesting the driver to abort I/O to a specific target.

DATA: (1) target (2) lun

SEVERITY: Error

LOG: Always

ACTION: Check the state of the target in question.

**elx\_mes0714: SCSI layer issued bus reset**

DESCRIPTION: The SCSI layer is requesting the driver to abort all I/Os to all targets on this HBA.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: Check the state of the targets in question.

**elx\_mes0716: FCP residual underrun, expected <len>, residual <resid>**

DESCRIPTION: An FCP device provided less data than was requested.

DATA: (1) fcpi\_parm (2) cmnd[0] (3) underflow

SEVERITY: Information

LOG: LOG\_FCP verbose

ACTION: None required.

**elx\_mes0717: FCP command <cmd> residual underrun converted to error**

DESCRIPTION: The driver converted this underrun condition to an error based on the underflow field in the SCSI command.

DATA: (1) len (2) resid (3) underflow

SEVERITY: Information

LOG: LOG\_FCP verbose

ACTION: None required.

**elx\_mes0721: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A



**elx\_mes0723: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0724: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0725: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0726: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

MODULE: N/A

ACTION: N/A

**elx\_mes0727: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0728: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0729: FCP cmd <cmnd> failed <target>/<lun>**

DESCRIPTION: The specified device failed an FCP command.

DATA: (1) status (2) result (3) xri (4) iotag

SEVERITY: Warning

LOG: LOG\_FCP verbose

ACTION: Check the state of the target in question.

**elx\_mes0730: FCP command failed: RSP**

DESCRIPTION: The FCP command failed with a response error.

DATA: (1) Status2 (2) Status3 (3) ResId (4) SnsLen (5) RspLen (6) Info3

SEVERITY: Warning

LOG: LOG\_FCP verbose

ACTION: Check the state of the target in question.

**elx\_mes0731: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0732: Retry FCP command due to 29,00 check condition**

DESCRIPTION: The issued FCP command got a 29,00 check condition and will be retried by the driver.

DATA: (1) \*lp (2) \*lp+1 (3) \*lp+2 (4) \*lp+3

SEVERITY: Information

LOG: LOG\_FCP verbose

ACTION: None required.

**elx\_mes0733: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0734: FCP read check error**

DESCRIPTION: The issued FCP command returned a read check error.

DATA: (1) fcpDI (2) rspResId (3) fcpi\_parm (4) cdb[0]

SEVERITY: Warning

LOG: LOG\_FCP verbose

ACTION: Check the state of the target in question.

### **elx\_mes0735: FCP read check error with check condition**

DESCRIPTION: The issued FCP command returned a read check error and a check condition.

DATA: (1) fcpDI (2) rspResId (3) fcpi\_parm (4) cdb[0]

SEVERITY: Warning

LOG: LOG\_FCP verbose

ACTION: Check the state of the target in question.

### **elx\_mes0736: Received Queue Full status from FCP device <tgt> <lun>**

DESCRIPTION: Received a Queue Full error status from specified FCP device.

DATA: (1) qfull\_retry\_count (2) qfull\_retries (3) currentOutstanding (4) maxOutstanding

SEVERITY: Information

LOG: LOG\_FCP verbose

ACTION: None required.

**elx\_mes0737: <ASC ASCQ> Check condition received**

DESCRIPTION: The issued FCP command resulted in a check condition.

DATA: (1) CFG\_CHK\_COND\_ERR (2) CFG\_DELAY\_RSP\_ERR (3) \*lp

SEVERITY: Information

LOG: LOG\_FCP | LOG\_CHK\_COND verbose

ACTION: None required.

**elx\_mes0738: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A



**elx\_mes0739: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0740: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0741: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0742: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0743: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0744: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0745: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0746: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

### **elx\_mes0747: Cmpl target reset**

DESCRIPTION: A driver-initiated target reset completed.

DATA: (1) scsi\_id (2) lun\_id (3) statLocalError (4) \*cmd + WD7

SEVERITY: Information

LOG: LOG\_FCP verbose

ACTION: None required.

### **elx\_mes0748: Cmpl LUN reset**

DESCRIPTION: A driver-initiated LUN reset completed.

DATA: (1) scsi\_id (2) lun\_id (3) statLocalError (4) \*cmd + WD7

SEVERITY: Information

LOG: LOG\_FCP verbose

ACTION: None required.

**elx\_mes0749: Cmpl abort task set**

DESCRIPTION: A driver-initiated abort task set completed.

DATA: (1) scsi\_id (2) lun\_id (3) statLocalError (4) \*cmd + WD7

SEVERITY: Information

LOG: LOG\_FCP verbose

ACTION: None required.

**elx\_mes0750: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0751: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0752: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0753: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0754: SCSI timeout**

DESCRIPTION: An FCP IOCB command was posted to a ring and did not complete within ULP timeout seconds.

DATA:(1) did (2) sid (3) command (4) iotag

SEVERITY: Error

LOG: Always

ACTION: If I/O is not going through the adapter, reboot the system; otherwise check the state of the target in question.



## Node Table Events (0900 - 0999)

### **elx\_mes0900: Cleanup node for NPort <nlp\_DID>**

DESCRIPTION: The driver node table entry for a remote NPort was removed.

DATA: (1) nlp\_flag (2) nlp\_state (3) nlp\_rpi

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

### **elx\_mes0901: FIND node DID mapped**

DESCRIPTION: The driver is searching for a node table entry, on the mapped node list, based on the DID.

DATA: (1) nlp (2) nlp\_DID (3) nlp\_flag (4) data1

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

**elx\_mes0902: FIND node DID mapped**

DESCRIPTION: The driver is searching for a node table entry, on the mapped node list, based on DID.

DATA: (1) nlp (2) nlp\_DID (3) nlp\_flag (4) data1

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

**elx\_mes0903: Add scsiid <sid> to BIND list**

DESCRIPTION: The driver is putting the node table entry on the binding list.

DATA: 1) bind\_cnt (2) nlp\_DID (3) bind\_type (4) blp

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

**elx\_mes0904: Add NPort <did> to PLOGI list**

DESCRIPTION: The driver is putting the node table entry on the plogi list.

DATA: (1) plogi\_cnt (2) blp

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

**elx\_mes0905: Add NPort <did> to ADISC list**

DESCRIPTION: The driver is putting the node table entry on the adisc list.

DATA: (1) adisc\_cnt (2) blp

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

**elx\_mes0906: Add NPort <did> to UNMAP list**

DESCRIPTION: The driver is putting the node table entry on the unmap list.

DATA: (1) unmap\_cnt (2) blp

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

**elx\_mes0907: Add NPort <did> to MAP list scsiid <sid>**

DESCRIPTION: The driver is putting the node table entry on the mapped list.

DATA: (1) map\_cnt (2) blp

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

**elx\_mes0908: FIND node DID bind**

DESCRIPTION: The driver is searching for a node table entry, on the binding list, based on DID.

DATA: (1) nlp (2) nlp\_DID (3) nlp\_flag (4) data1

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

**elx\_mes0909: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

### **elx\_mes0910: FIND node DID unmapped**

DESCRIPTION: The driver is searching for a node table entry on the unmapped node list, based on the SCSI ID.

DATA: (1) nlp (2) nlp\_DID (3) nlp\_flag (4) data1

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

### **elx\_mes0911: FIND node DID unmapped**

DESCRIPTION: The driver is searching for a node table entry, on the unmapped node list, based on DID.

DATA: (1) nlp (2) nlp\_DID (3) nlp\_flag (4) data1

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

**elx\_mes0912: N/A**

DESCRIPTION: N/A

N/A

SEVERITY: N/A

LOG: N/A

MODULE: N/A

ACTION: N/A

**elx\_mes0913: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

MODULE: N/A

ACTION: N/A

**elx\_mes0914: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

MODULE: N/A

ACTION: N/A

**elx\_mes0915: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

MODULE: N/A

ACTION: N/A



**elx\_mes0916: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0917: N/A**

DESCRIPTION: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0918: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0919: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0920: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0921: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0922: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0923: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0924: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0925: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0926: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

**elx\_mes0927: GET nodelist**

DESCRIPTION: The driver is allocating a buffer to hold a node table entry.

DATA: (1) bp (2) fc\_free

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

### **elx\_mes0928: PUT nodelist**

DESCRIPTION: The driver is freeing a node table entry buffer.

DATA: (1) bp (2) fc\_free

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

### **eelx\_mes0929: FIND node DID unmapped**

DESCRIPTION: The driver is searching for a node table entry, on the unmapped node list, based on DID.

DATA: (1) nlp (2) nlp\_DID (3) nlp\_flag (4) data1

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

### **elx\_mes0930: FIND node DID mapped**

DESCRIPTION: The driver is searching for a node table entry, on the mapped node list, based on DID.

DATA: (1) nlp (2) nlp\_DID (3) nlp\_flag (4) data1

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

### **elx\_mes0931: FIND node DID bind**

DESCRIPTION: The driver is searching for a node table entry, on the binding list, based on DID.

DATA: (1) nlp (2) nlp\_DID (3) nlp\_flag (4) data1

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.



**elx\_mes0932: FIND node did <did> NOT FOUND**

DESCRIPTION: The driver was searching for a node table entry based on the DID and the entry was not found.

DATA: (1) order

SEVERITY: Information

LOG: LOG\_NODE verbose

ACTION: None required.

## FCP Target Mode Events (1100 - 1199)

**1100 TMI message: LUN <lunNum> RDY blk <blkCnt> byt <byteCnt>**

DESCRIPTION: Display TGTM LUN Ready status followed by the number of '512-byte' blocks and the total number of bytes.

DATA: none

SEVERITY: information

LOG: LOG\_TGTM verbose

MODULE: fctarget.c

ACTION: None required.

**1101 Tmi message: Line <num> HBA <num> has <num> LUNs cfg'd**

DESCRIPTION: The number of LUNs that were successfully configured by configuration line <num> on HBA <num>.

DATA: none

SEVERITY: information

LOG: LOG\_TGTM verbose

MODULE: fc<LINUX>fcp.c

ACTION: None required.

**1102 Tmi message: No LUNs configuration'd by line <num> on HBA <num>**

DESCRIPTION: No LUNs were configured by the specified configuration line.

DATA: none

SEVERITY: information

LOG: LOG\_TGTM verbose

MODULE: fc<LINUX>fcp.c

ACTION: If this configuration is not intended, check the LUN configuration on the specified configuration line.

**1103 TMc message: Config line <num> starting LUN number <num> should be odd**

DESCRIPTION: The starting LUN number on the specified configuration line is not odd.

DATA: none

SEVERITY: error config

LOG: always

MODULE: fc<LINUX>fcp.c

ACTION: Check the LUN configuration on the specified configuration line. The LUN sequence mode is odd, therefore the starting LUN number must be odd.

**1104 TMc message: Config line <num> starting LUN number <num> should be even.**

DESCRIPTION: The starting LUN number on the specified configuration line is not even.

DATA: none

SEVERITY: error config

LOG: always

MODULE: fc<LINUX>fcp.c

ACTION: Check the LUN configuration on the specified configuration line. The LUN sequence mode is even, therefore the starting LUN number must be even.

**1105 TMc message: Config line <num> has illegal The LUN sequence mode.**

DESCRIPTION: The specified configuration line has an illegal LUN sequence mode.

DATA: none

SEVERITY: error config

LOG: always

MODULE: fc<LINUX>fcp.c

ACTION: Check the LUN configuration on the specified configuration line. The LUN sequence mode is illegal.

**1106 TMi message: This config line <num> HBA <num> disabled per LOFF.**

DESCRIPTION: The specified configuration line is diasbled.

DATA: none

SEVERITY: information

LOG: LOG\_TGTM verbose

MODULE: fc<LINUX>fcp.c

ACTION: If this configuration is not intended, check the LUN configuration on the specified configuration line. The first member of the configuration structure can be set to disable the line (LOFF) or enable the line (LON).

**1107 TMI message: HBA <num> LUN info array failed to allocate.**

DESCRIPTION: The main LUN information array for the specified HBA failed to allocate.

DATA: none

SEVERITY: error

LOG: always

MODULE: fc<LINUX>fcv.c

ACTION: This error is most likely caused by lack of host memory resources.  
Suggested actions:

- Add additional memory to the host.
- If multiple TGTM LUNs are configured, reduce the number of TGTM LUNs configured.
- Reduce the LUN size.

**1108 TMc message: Config line <num> starting LUN <num> > max LUN <num>.**

DESCRIPTION: The starting LUN number on the specified configuration line is greater than the maximum LUN number allowed.

DATA: none

SEVERITY: error config

LOG: always

MODULE: fc<LINUX>fcp.c

ACTION: Check the LUN configuration on the specified configuration line.

**1109 TMc message: Config line <num> has illegal LUN count <cnt> > max LUN <num>.**

DESCRIPTION: The LUN count on the specified configuration line exceeds the maximum LUN number allowed.

DATA: none

SEVERITY: error config

LOG: always

MODULE: fc<LINUX>fcp.c

ACTION: Check the LUN configuration on the specified configuration line.

**1110 TMc message: Config line <num> has illegal LUN count <cnt> < 1**

DESCRIPTION: The LUN count on the specified configuration line is less than 1.

DATA: none

SEVERITY: error config

LOG: always

MODULE: fc<LINUX>fcp.c

ACTION: Check the LUN configuration on the specified configuration line.

**1111 TMc message: Config line <num> starting LUN <num> + cnt <cnt> > max LUN <num>**

DESCRIPTION: The LUN count on the specified configuration line, plus the LUN count exceeds the MAX support LUN number.

DATA: none

SEVERITY: error config

LOG: always

MODULE: fc<LINUX>fcp.c

ACTION: Check the LUN configuration on the specified configuration line.



**1112 TMc message: Config line <num> has illegal The LUN sequence mode <mode>**

DESCRIPTION: The specified configuration line has an illegal The LUN sequence mode.

DATA: none

SEVERITY: error config

LOG: always

MODULE: fc<LINUX>fcp.c

ACTION: Check the LUN configuration on the specified configuration line.

**1113 TMc message: Config line <num> starting LUN <num> + od-ev LUN (cnt <cnt> \* 2) > max LUN <num>**

DESCRIPTION: The starting LUN number plus the LUN count on the specified configuration line exceeds the MAX supported LUN number. Note: Because the LUN sequence is odd or even, the LUN count is multiplied by two prior to adding it to the starting LUN number.

DATA: none

SEVERITY: error config

LOG: always

MODULE: fc<LINUX>fcp.c

ACTION: Check the LUN configuration on the specified configuration line.

**1114 TMc message: Config line <num> starting LUN <num> was prev cfg'd by line <num>**

DESCRIPTION: The starting LUN number on the specified configuration line has been previously configured by the specified configuration line.

DATA: none

SEVERITY: error config

LOG: always

MODULE: fc<LINUX>fcplib.c

ACTION: Check the LUN configuration on the specified configuration line.

### **1115 TMe message: LUN <num> failed to allocate info buffer**

DESCRIPTION: The specified LUN failed to allocate an information buffer.

DATA: none

SEVERITY: error

LOG: always

MODULE: fc<LINUX>fcpx.c

ACTION: This error is most likely caused by lack of host memory resources.  
Suggested actions:

- Add additional memory to the host.
- If multiple TGT LUNs are configured, reduce the number of TGT LUNs configured.
- Reduce the LUN size.

### **1116 TMe message: LUN <num> mem alloc error during LUN population**

DESCRIPTION: While attempting to populate the specified LUN, host memory resource allocation failed.

DATA: none

SEVERITY: error

LOG: always

MODULE: fcmemb.c

ACTION: This error is most likely caused by lack of host memory resources.  
Suggested actions:

- Add additional memory to the host.
- If multiple TGTM LUNs are configured, reduce the number of TGTM LUNs configured.
- Reduce the LUN size.

**1117 TMI message: HBA <num> LUNs Ready <total> last LUN <num>**

DESCRIPTION: Display the number of LUNs ready and the last LUN number for the specified HBA.

DATA: none

SEVERITY: information

LOG: LOG\_TGTM verbose

MODULE: fcmemb.c

ACTION: None required.

**1118 TMI message: HBA <num> LUNs Ready <total>**

DESCRIPTION: This message is displayed if at least one LUN was configured but no LUNs came ready. The total LUNs ready will always be 0.

DATA: none

SEVERITY: information

LOG: LOG\_TGTM verbose

MODULE: fcmemb.c

ACTION: If this configuration is not intended, check the LUN configuration on the specified HBA.

### **1119 TMe message: LUN <num> disk resource alloc error**

DESCRIPTION: While attempting to populate the disk of the specified LUN, there was a resource allocation error.

DATA: (1) retStatus

SEVERITY: error

LOG: always

MODULE: fctarget.c

ACTION: This error is most likely caused by lack of host memory resources.  
Suggested actions:

- Add additional memory to the host.
- If multiple TGTM LUNs are configured, reduce the number of TGTM LUNs configured.
- Reduce the LUN size.

### **1120 TMe message: LUN <num> SCSI WriteBuf resource alloc error**

**DESCRIPTION:** While attempting to populate the SCSI write buffer of the specified LUN, there was a resource allocation error.

**DATA:** (1) retStatus

**SEVERITY:** error

**LOG:** always

**MODULE:** fctarget.c

**ACTION:** This error is most likely caused by lack of host memory resources.  
Suggested actions:

- Add additional memory to the host.
- If multiple TGTM LUNs are configured, reduce the number of TGTM LUNs configured.
- Reduce the LUN size.

### **1121 TMe message: LUN <num> alloc error, unknown retStatus**

DESCRIPTION: During LUN population, an unknown function return status was received.

DATA: (1) retStatus

SEVERITY: error

LOG: always

MODULE: fctarget.c

ACTION: This error could indicate a software driver problem. If problems persist report these errors to Technical Support.

### **1122 TMi message: LUN <num> SCSI WriteBuf bytes <num>**

DESCRIPTION: Display the SCSI WriteBuf size for the specified LUN.

DATA: none

SEVERITY: information

LOG: LOG\_TGTM verbose

MODULE: fctarget.c

ACTION: None required.



### **1123 TMw message: Temporary lack of resources, no BPL full BDE buf**

DESCRIPTION: Attempting to set up IOCB but there were no BPL full BDE buffers available. This condition should be temporary.

DATA: (1) retStatus

SEVERITY: warning

LOG: LOG\_TGTM verbose

MODULE: fctarget.c

ACTION: None required.

### **1124 TMw message: Temporary lack of resources, no BPL partial BDE buf**

DESCRIPTION: Attempting to set up IOCB but there were no BPL partial BDE buffers available. This condition should be temporary.

DATA: (1) retStatus

SEVERITY: warning

LOG: LOG\_TGTM verbose

MODULE: fctarget.c

ACTION: None required.

**1125 TMw message: RcvRing <ringNum> is temporary out of posted bufs**

DESCRIPTION: The specified receive ring is temporarily out of posted buffers. This should be a temporary condition.

DATA: (1) fc\_missbufcnt (2) NoRcvBuf

SEVERITY: warning

LOG: LOG\_TGTM verbose

MODULE: fctarget.c

ACTION: None required.

**1126 TMw message: Config line <num> starting LUN number <num> should be odd**

DESCRIPTION: The starting LUN number on the specified config line is not odd.

DATA: None

SEVERITY: error config

LOG: Always

MODULE: fc<host>fcpc.c

ACTION: Check LUN configuration on specified configuration line. LUN sequence mode is ODD, therefore starting LUN number must be ODD.

**1127 TMw message: Config line <num> starting LUN number <num> should be even**

DESCRIPTION: The starting LUN number on the specified config line is not even.

DATA: None

SEVERITY: error config

LOG: Always

MODULE: fc<host>fcplib.c

ACTION: Check LUN configuration on specified configuration line. LUN sequence mode is EVEN, therefore starting LUN number must be EVEN.

## Miscellaneous Events (1200 - 1299)

### **elx\_mes1200: Cannot unload driver while lpfcdiag interface is active**

DESCRIPTION: An attempt was made to unload the driver while the DFC interface was active.

DATA: (1) refcnt (2) instance

SEVERITY: Error

LOG: Always

ACTION: Exit any application that uses the DFC diagnostic interface before attempting to unload the driver.

### **elx\_mes1201: lpfc\_kmalloc: bad phba**

DESCRIPTION: The driver manages its own memory for internal use. This error indicates a problem occurred in the driver memory management routines. This error could also indicate the host system is low on memory resources.

DATA: 1) size (2) type (3) fc\_idx\_dmapool

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a driver or host operating system problem. If the problem persists, report the error to Technical Support.

**elx\_mes1202: linux\_kmalloc: Bad size**

DESCRIPTION: The driver manages its own memory for internal use. This error indicates that a problem occurred in the driver memory management routines. This error could also indicate that the host system is low on memory resources.

DATA: (1) size (2) type (3) fc\_idx\_dmapool

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a driver or host operating system problem. If the problem persists, report the error to Technical Support.

**elx\_mes1203: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A

#### **elx\_mes1204: lpfc\_kmalloc: bad virtual addr**

**DESCRIPTION:** The driver manages its own memory for internal use. This error indicates that a problem occurred in the driver memory management routines. This error could also indicate that the host system is low on memory resources.

**DATA:** (1) i (2) size ( 3) type (4) fc\_idx\_dmapool

**SEVERITY:** Error

**LOG:** Always

**ACTION:** This error could indicate a driver or host operating system problem. If the problem persists, report the error to Technical Support.

#### **elx\_mes1205: lpfc\_kmalloc: dmapool FULL**

**DESCRIPTION:** The driver manages its own memory for internal use. This error indicates that a problem occurred in the driver memory management routines. This error could also indicate that the host system is low on memory resources.

**DATA:** (1) i (2) size ( 3) type (4) fc\_idx\_dmapool

**SEVERITY:** Error

**LOG:** Always

**ACTION:** This error could indicate a driver or host operating system problem. If the problem persists, report the error to Technical Support.

### **elx\_mes1206: linux\_kfree: Bad phba**

**DESCRIPTION:** The driver manages its own memory for internal usage. This error indicates a problem occurred in the driver memory management routines. This error could also indicate the host system is low on memory resources.

**DATA:** (1) size (2) fc\_idx\_dmapool

**SEVERITY:** Error

**LOG:** Always

**ACTION:** This error could indicate a driver or host operating system problem. If the problem persists, report the error to Technical Support.

### **elx\_mes1207: linux\_kfree: NOT in dmapool**

**DESCRIPTION:** The driver manages its own memory for internal use. This error indicates that a problem occurred in the driver memory management routines. This error could also indicate that the host system is low on memory resources.

**DATA:** (1) virt (2) size (3) fc\_idx\_dmapool

**SEVERITY:** Error

**LOG:** Always

**ACTION:** This error could indicate a driver or host operating system problem. If the problem persists, report the error to Technical Support.

**elx\_mes1208: C\_CT request error**

DESCRIPTION: The CT response returned more data than the user buffer could hold.

DATA: (1) dfc\_flag (2) 4096

SEVERITY: Information

LOG: LOG\_MISC verbose

ACTION: Modify the user application issuing a CT request to allow for a larger response buffer.

**elx\_mes1209: N/A**

DESCRIPTION: N/A

DATA: N/A

SEVERITY: N/A

LOG: N/A

ACTION: N/A



**elx\_mes1210: Convert ASC to hex. Input byte cnt <1**

DESCRIPTION: ASCII string to hexadecimal conversion failed. The input byte count is greater than 1.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver problem. If the problem persists, report the error to Technical Support.

**elx\_mes1211: Convert ASC to hex. Input byte cnt > max <num>**

DESCRIPTION: ASCII string to hexadecimal conversion failed. The input byte count exceeds max <num>.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver problem. If problems persist report, these errors to Technical Support.

### **elx\_mes1212: Convert ASC to hex. Output buffer to small**

DESCRIPTION: ASCII string to hexadecimal conversion failed. The output buffer byte size is less than 1/2 of the input byte count. Every two input characters (bytes) require one output byte.

DATA: None

SEVERITY: Error

LOG: Always

ACTION: This error could indicate a software driver problem. If the problem persists, report the error to Technical Support.

### **elx\_mes1213: Convert ASC to hex. Input char seq not ASC hex**

DESCRIPTION: The ASCII hexadecimal input string contains a non-ASCII hex character.

DATA: None

SEVERITY: Error configuration

LOG: Always

ACTION: Make necessary changes to the lpfc configuration file.

## Link Events (1300 - 1399)

### **elx\_mes1300: Re-establishing Link, timer expired**

DESCRIPTION: The driver detected a condition where it had to re-initialize the link.

DATA: (1) fc\_flag (2) fc\_ffstate

SEVERITY: Error

LOG: Always

ACTION: If numerous link events are occurring, check the physical connections to the Fibre Channel network.

### **elx\_mes1301: Re-establishing Link**

DESCRIPTION: The driver detected a condition in which it had to re-initialize the link.

DATA: (1) status (2) status1 (3) status2

SEVERITY: Information

LOG: LOG\_LINK\_EVENT verbose

ACTION: If numerous link events are occurring, check the physical connections to the Fibre Channel network.

### **elx\_mes1302: Reset link speed to auto. 1G HBA cfg'd for 2G**

DESCRIPTION: The driver is reinitializing the link speed to auto-detect.

DATA: (1) current link speed

SEVERITY: Warning

LOG: LOG\_LINK\_EVENT verbose

ACTION: None required.

### **elx\_mes1303: Link Up Event <eventTag> received**

DESCRIPTION: A link up event was received. It is also possible for multiple link events to be received together.

DATA:(1) fc\_eventTag (2) granted\_AL\_PA (3) UlnkSpeed (4) alpa\_map[0]

Detail: If link events received, log (1) last event number received, (2) ALPA granted, (3) Link speed (4) number of entries in the loop init LILP ALPA map. An ALPA map message is also recorded if LINK\_EVENT verbose mode is set. Each ALPA map message contains 16 ALPAs.

SEVERITY: Error

LOG: Always

ACTION: If numerous link events are occurring, check the physical connections to the Fibre Channel network.

### **elx\_mes1304: Link Up Event ALPA map**

DESCRIPTION: A link up event was received.

DATA: (1) wd1 (2) wd2 (3) wd3 (4) wd4

SEVERITY: Warning

LOG: LOG\_LINK\_EVENT verbose

ACTION: If numerous link events are occurring, check the physical connections to the Fibre Channel network.

### **elx\_mes1305: Link Down Event <eventTag> received**

DESCRIPTION: A link down event was received.

DATA: (1) fc\_eventTag (2) hba\_state (3) fc\_flag

SEVERITY: Error

LOG: Always

ACTION: If numerous link events are occurring, check the physical connections to the Fibre Channel network.

### **elx\_mes1306: Link Down timeout**

DESCRIPTION: The link was down for greater than the configuration parameter (lpfc\_linkdown\_tmo) in seconds. All I/O associated with the devices on this link will fail.

DATA: (1) hba\_state (2) fc\_flag (3) fc\_ns\_retry

SEVERITY: Warning

LOG: LOG\_LINK\_EVENT | LOG\_DISCOVERY verbose

ACTION: Check the HBA cable/connection to the Fibre Channel network.

### **elx\_mes1307: READ\_LA mbox error <mbxStatus> state <hba\_state>**

DESCRIPTION: The driver cannot determine what type of link event occurred.

DATA: None

SEVERITY: Information

LOG: LOG\_LINK\_EVENT verbose

ACTION: If numerous link events are occurring, check the physical connections to the Fibre Channel network. May indicate a possible hardware or firmware problem.

## SLI Events (1400 - 1499)

### 1400 SLe message: Unknown IOCB command

DESCRIPTION: Received an unknown IOCB command completion.

DATA: (1) ulpCommand (2) ulpStatus (3) ulploTag (4) ulpContext

SEVERITY: error

LOG: always

MODULE: lp6000.C

ACTION: This error could indicate a software driver or firmware problem. If this problem persists, report this error to Technical Support.

### 1401 SLe message: Command ring <num> timeout

DESCRIPTION: An IOCB command was posted to a ring and did not complete within a timeout based on R\_A\_TOV.

DATA: (1) IOCB command (2) ulpCommand

SEVERITY: error

LOG: always

MODULE: fcscsib.c

ACTION: This error could indicate a software driver or firmware problem. If no I/O is going through the adapter, reboot the system. If this problem persists, report this error to Technical Support.

### **1402 SLe message: Command ring <num> timeout**

**DESCRIPTION:** An IOCB command was posted to a ring and did not complete within a timeout based on R\_A\_TOV.

**DATA:** none

**SEVERITY:** error

**LOG:** always

**MODULE:** fcscsib.c

**ACTION:** This error could indicate a software driver or firmware problem. If no I/O is going through the adapter, reboot the system. If this problem persists, report this error to Technical Support.



## Log Messages - IOCTL Events (1600 - 1699)

### **elx\_mes1600: dfc\_ioctl entry**

DESCRIPTION: The entry point for processing diagnostic ioctl.

DATA:(1) c\_cmd (2) c\_arg1 (3) c\_arg2 (4) c\_outsz

SEVERITY: Information

LOG: LOG\_IP verbose

ACTION: None required.

### **elx\_mes1601: dfc\_ioctl exit**

DESCRIPTION: The exit point for processing diagnostic ioctl.

DATA: (1) rc (2) c\_outsz (3) c\_dataout

SEVERITY: Information

LOG: LOG\_IP verbose

ACTION: None required.

**elx\_mes1602: dfc\_data\_alloc**

DESCRIPTION: Allocating data buffer to process dfc ioct.

DATA: (1) fc\_dataout (2) fc\_outsz

SEVERITY: Information

LOG: LOG\_IOC verbose

ACTION: None required.

**elx\_mes1603: dfc\_data\_free**

DESCRIPTION: The data buffer is being freed to process dfc ioct.

DATA: (1) fc\_dataout (2) fc\_outsz

SEVERITY: Information

LOG: LOG\_IOC verbose

ACTION: None required.

**elx\_mes1604: lpfc\_ioctl:error**

DESCRIPTION: The SCSI send request buffer size limit was exceeded.

DATA: (1) error number index

SEVERITY: Error

LOG: Always

ACTION: Reduce the application program's SCSI send request buffer size to less than 320K bytes.

**elx\_mes1605: Issue Report LUN on NPort <nlp\_DID>**

DESCRIPTION: The driver issued an ioctl REPORT\_LUN SCSI command to a FCP target.

DATA: (1) nlp\_failMask (2) nlp\_state (3) nlp\_rpi

SEVERITY: Information

LOG: LOG\_IOC verbose

ACTION: None required.